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THE TREATMENT OF THE COMMON DISORDERS OF DIGESTION

THE TREATMENT OF THE COMMON DISORDERS OF DIGESTION

A HANDBOOK FOR PHYSICIANS AND STUDENTS

BY

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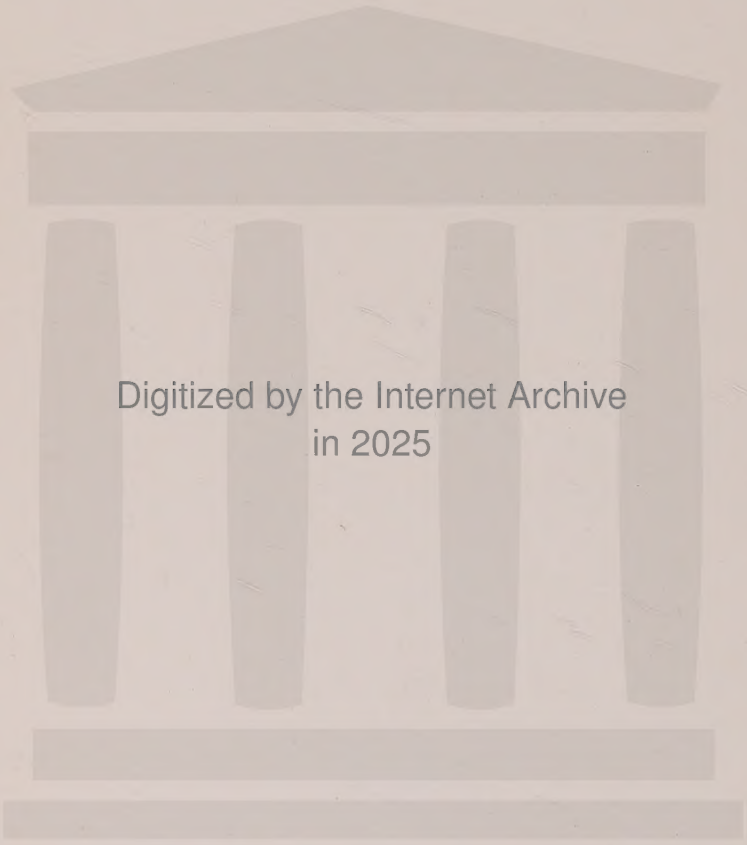
TO THE MEMORY OF
MY MOTHER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PREFACE

This handbook is intended to serve as a guide in the treatment of those forms of digestive disorders most commonly met with in the practice of medicine. It is hoped that the subject is so presented that the reader will carry away with him serviceable working plans of procedure that can readily be modified to suit individual needs of practice. To this end an endeavor has been made to state principles and objectives of therapy with clarity and precision. Reasons are given for every procedure wherever possible, and a dogmatic drug-catalog method of presentation has been carefully avoided.

The diet lists presented in this book are, with some exceptions, based on those in use at the Vanderbilt Clinic. In their present form these diets are the outgrowth of years of cumulative experience on the part of many of the writer's predecessors and associates. Permission to utilize this material has been kindly granted by the Board of Managers.

Grateful acknowledgments are due to the Editors of "Medical Life" and the "Medical Clinics of North America," respectively, for permission to use, in whole or in part, several articles that have previously appeared in these publications.

JOHN L. KANTOR.

New York City.

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THE TREATMENT OF THE COMMON DISORDERS OF DIGESTION

CHAPTER I

GENERAL PRINCIPLES AND METHODS

PROPHYLAXIS — GENERAL MANAGEMENT — DIET — HEIGHT AND WEIGHT STANDARDS—GASTRIC LAVAGE—INTRADUODENAL THERAPY —DRUG THERAPY—PHYSICAL THERAPY—HYDROTHERAPY

Prophylaxis.—Obviously, the prophylaxis of digestive diseases begins in childhood. Every effort should be made by parents, pediatrists, and the family physician, to build up sound digestive habits. All sorts of perversions gain a firm foothold in the early years. Thus, disorders of appetite are particularly common because of the habit of eating irregularly between meals and indulging almost continuously in sweets. Constipation appears and becomes chronic because the habit of regular evacuations is either never taught or never mastered. Malnutrition, which one would think intolerable in childhood in civilized and prosperous communities, is strikingly prevalent. Anyone whose business it is to converse daily with dyspeptics cannot but be struck by the large number of people who can trace their trouble directly to the days of their childhood. And yet, if such rules of digestive hygiene as the following were universally practiced "from the beginning" much future trouble would undoubtedly be avoided.

1. Meals should be taken on time.
2. Three meals a day are sufficient for normal people.
3. Food should be properly chewed.

4. The normal dietary should include all the chief classes of foods: Milk, butter, eggs; cereals; meat and fish; green and starchy vegetables; fruit.

5. Sweets should be used only as desserts.

6. A definite amount of water should be drunk daily (up to two quarts for an adult).

7. The bowels should be moved regularly without cathartics.

8. The mouth and teeth should be kept in good order.

Children whose parents are dyspeptic or asthenic or neurotic are very prone to inherit weak digestions. Such children should be taken in hand early, examined thoroughly, and a rigorous system of prophylaxis applied to their individual requirements.

In normal adults prophylaxis is largely a matter of common sense and moderation in living and the continuance of those habits of hygiene presumably learned in childhood. Particular pains should be taken that meals be eaten at regular intervals and under conditions free from mental preoccupation, worry or depressing emotions. The development of that common modern habit, tachyphagia—rapid eating—should be especially avoided, as once established, it is exceedingly hard to get rid of.

Adults who are known to be susceptible to digestive disorders should be particularly careful to live within their reserve as determined by complete and careful digestive studies. It cannot be too strongly recommended that they keep themselves under observation even at times that they feel free from symptoms. This holds particularly true for patients who have undergone surgical operations on the digestive tract.

General Management.—As in all chronic conditions, the patient must be treated as well as the disease. The more intense the individualization, the more successful the therapy. At the preliminary general physical examination special

effort should be made to rule out the possibility of disease lurking in some other system than the digestive tract, for it is well known that dyspeptic symptoms may arise from distant sources. As the result of such a general survey a good many leads may be opened up whose correction may help to secure a good therapeutic result. Every doctor can recall cases where a headache thought to arise from "autointoxication" was found to be due to eyestrain or cerebrospinal lues or sinusitis or impacted molars; where persistent anorexia was found to be caused by unsuspected pulmonary tuberculosis; where flatulence was associated with hypertension and arteriosclerosis; where constipation arose from pelvic inflammation; and so on. In addition, even where frank gastrointestinal disease is present, all the associated defects should be remedied as quickly as possible. In this connection the special importance of sound teeth and gums need hardly be emphasized.

In a larger sense, too, successful therapy calls for serious consideration of personal as well as physical factors. The patient not only vegetates, but works, plays, rests and worries. The doctor should familiarize himself as much as possible with his patient's mental and emotional make-up. He should know something of his work and his responsibilities; he should be able to give sensible advice as to rest and recreation; he should inspire confidence and help restore hope and the "will to get well."

Diet.—The treatment of gastrointestinal disorders by dietary measures is recognized as fundamental by the laity as well as by physicians. Dietary rules and diet lists may properly be regarded as experience tables much like those in use by life insurance actuaries. These lists are built up as the result of the composite experiences of thousands of sufferers and, to a lesser extent, of actual scientific test and experiment. In short, they represent or furnish what might be called average lines of procedure. It should be well understood, however, that diet lists *as published* are

for the benefit of the physician and are not to be handed directly to the patient. Indeed, so great are individual differences in response to foods that one cannot expect a prearranged diet list to suit every subject exactly. When planning a diet in actual practice, therefore, it is always best to begin by making a detailed record of the patient's eating habits, in order not only that his faults may be corrected, but that his personal peculiarities and idiosyncrasies may be given due consideration. A diet thus "made to order" takes the form of an individual prescription, and has just that advantage in suiting the needs of the patient.

Notwithstanding the variability of man's food and the large number of combinations of eatables that may be and have been invented it may be well to state at this point that there are in reality but three main objects for which diets are prescribed in gastrointestinal diseases. These objects are:

1. To allay gastrointestinal irritability.
2. To improve the state of nutrition.
3. To increase the bulk of the feces.

1. In such conditions as hyperacidity, ulcer, diarrhea, etc., only the most bland, nonirritating, and easily digested foods are indicated. By "most easily digested" we mean such foods as, in addition to being universally well tolerated by dyspeptics, have been shown by special experiments, to leave the stomach most rapidly or to put the least strain upon the intestine. In this class are usually included milk, eggs, well-cooked fish, meat-juice, finely chopped lean meat, mashed potatoes, purées, light puddings, Uneeda biscuit, toast, water.

On the other hand, the foods that experience has shown to be most difficult of digestion fall in the following four groups: (a) Sour and spicy foods, e. g., vinegar, pickles, relishes; (b) Fat and greasy foods, e. g., fat meats, fried foods, gravies; (c) Sweets, e. g., pastries, candies; (d)

Foods with coarse, irritating residues, e. g., cucumbers, cabbage.

This simple grouping of the common foods, once mastered, renders the subject of dietetics relatively simple. It should, of course, always be remember that the preparation of food is ever a matter of great importance, the same article being easy or difficult to digest, depending on the degree of skill exercised in its cooking. This is very well illustrated in every-day experience in the case of cereals and potatoes.

2. It is not necessary for the physician to calculate calories in order to fatten a patient. All that is required is a scale and a measuring rod and a knowledge of the normal weight of a person for his age, sex, and height. The latter information can be obtained from life insurance tables such as those of Symonds, reproduced herewith. The height includes shoes and the weight includes ordinary clothing.

In practice one proceeds to make up the deficit between the patient's actual weight and his normal weight by forced feeding. At the same time the energy output must be kept down as much as possible, absolute bed rest being enjoined where the speediest results are desired. It has been shown that in the latter condition (rest in bed) the body requires but six-sevenths the number of calories needed when the subject is up and about.

It is really a matter of secondary importance just what foods are selected for the fattening process. So long as the diet is well tolerated and the patient eats more than he has been taking of nutritious foodstuffs, the result will be achieved. A more detailed description of the usual procedure will be given subsequently (see Chapter III).

3. Increasing the bulk of the diet is a favorite method of treating constipation. This principle is particularly applicable in cases where the fecal mass is so far reduced and dried as to fail in its function of stimulating adequate intestinal peristalsis. The addition to the diet of fruits and

SYMONDS' TABLE OF HEIGHT AND WEIGHT FOR MEN AT DIFFERENT AGES*

Based on 74,162 Accepted Applicants for Life Insurance

Ages:	15-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
5 ft. 0 in.	120	125	128	131	133	134	134	134	131	...
1 in.	122	126	129	131	134	136	136	136	134	...
2 in.	124	128	131	133	136	138	138	138	137	...
3 in.	127	131	134	136	139	141	141	141	140	140
4 in.	131	135	138	140	143	144	145	145	144	143
5 in.	134	138	141	143	146	147	149	149	148	147
6 in.	138	142	145	147	150	151	153	153	153	151
7 in.	142	147	150	152	155	156	158	158	158	156
8 in.	146	151	154	157	160	161	163	163	163	162
9 in.	150	155	159	162	165	166	167	168	168	168
10 in.	154	159	164	167	170	171	172	173	174	174
11 in.	159	164	169	173	175	177	177	178	180	180
6 ft. 0 in.	165	170	175	179	180	183	182	183	185	185
1 in.	170	177	181	185	186	189	188	189	189	189
2 in.	176	184	188	192	194	196	194	194	192	192
3 in.	181	190	195	200	203	204	201	198	...	...

*From Sherman, H. C.; Chemistry of Food and Nutrition, New York, The Macmillan Co., 1916, pp. 216, 217.

SYMONDS' TABLE OF HEIGHT AND WEIGHT FOR WOMEN AT DIFFERENT AGES

Based on 58,855 Accepted Applicants for Life Insurance

Ages:	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
4 ft. 11 in.	111	113	115	117	119	122	125	128	128	126
5 ft. 0 in.	113	114	117	119	122	125	128	130	131	129
1 in.	115	116	118	121	124	128	131	133	134	132
2 in.	117	118	120	123	127	132	134	137	137	136
3 in.	120	122	124	127	131	135	138	141	141	140
4 in.	123	125	127	130	134	138	142	145	145	144
5 in.	125	128	131	135	139	143	147	149	149	148
6 in.	128	132	135	137	143	146	151	153	153	152
7 in.	132	135	139	143	147	150	154	157	156	155
8 in.	136	140	143	147	151	155	158	161	161	160
9 in.	140	144	147	151	155	159	163	166	166	165
10 in.	144	147	151	155	159	163	167	170	170	169

vegetables that contain much fibrous residue, together with plenty of water, serves to increase the unabsorbable intestinal content and promotes its regular evacuation.

Gastric Lavage.—There is hardly any single therapeutic measure which gives greater and more immediate relief

Fig. 1.—Gastric lavage with aspirator. First step. Aspiration of contents. Note: (1) Partly exhausted aspirating bulb; (2) glass window in stomach tube; (3) empty graduates on table (front row) ready to receive gastric residue and subsequent washings; (4) lavage water in large graduates (rear). This should be placed nearer the operator. Observe also patient holding basin partly filled with water to keep his hands occupied and out of the way, as well as nurse holding tube steady by grasping it as near mouth as possible.

than gastric lavage when properly executed. This procedure is primarily designed (except, of course, in cases of poisoning) for the removal of fermenting and decomposing

residues whenever the stomach fails to empty properly from any cause. It is by no means a matter of indifference just when in the day lavage is practiced. For most ambulant patients the best time is in the late afternoon or early evening, just before the last meal is taken. In this way the stomach is not only put in the best condition for the reception and digestion of what is often the heaviest meal, but is given the whole night in which to do it. In other

Fig. 2.—Gastric lavage with aspirator. Second step. Injection of water. Note residue obtained on original aspiration *(see Fig. 1)* and set aside in the first of the series of graduates. Subsequent aspirations and injections are made in the same manner. See Fig. 3.

cases, as in ulcer patients on bed rest cure, lavage at night is preferable, in order to diminish excessive night secretions.

A very satisfactory technic calls for the use of the Ewald evacuator. This apparatus is nothing but a stomach tube into the end of which a rubber aspirating bulb is inserted. In detail, it consists of a standard size (No. 30 Fr.) stom-

ach tube permanently connected to a short run (three to four inches) of rubber tubing by means of a window of glass tubing two to three inches in length. The object of this window is to facilitate observation of the inflow and outflow through the apparatus. The hard rubber tip of the aspirating bulb fits directly into the open end of the short piece of rubber tubing at the end of the stomach tube. The bulb itself is very much like a Politzer bag, only larger, and holds approximately 300 c.c.

With this simple apparatus gastric lavage is performed as follows: The stomach tube is introduced in the usual manner. The aspirating bulb is then completely exhausted

Fig. 3.—Gastric lavage with aspirator. Lavage completed. Series of graduates containing gastric residue in first vessel, washings in the next three, and pure water (for comparison) in the fifth. Strips of Congo paper (color changes not reproduced) were dipped into the graduates to show disappearance of acid as the lavage progressed.

of air by pressure of the hand, is inserted into the end of the stomach tube, and the gastric residue evacuated. The contents thus recovered may be expressed into the first of a series of large graduates for subsequent study. The bulb is then filled with water, or any other lavage solution, and its contents are completely expressed through the tube into the stomach. The bulb is then allowed to refill slowly with the returning lavage water, it is detached, and its contents either discarded or saved in the second of the series of

graduates. In this manner the procedure is repeated again and again until the return is clear. By comparing the successive wash waters in the series of graduates, as sug-

Fig. 4.—Intestinal intubation. Tube still in stomach. Tip approaching pylorus.

gested, a good idea is obtained of the actual progress of the washing.

The amount of fluid to be used depends entirely upon how long it takes for the water to come back clear. Bar-

ring contraindications on the part of the patient, every lavage should be continued until the return is quite free from residue. With the technic described, it is easy to avoid leaving water behind in the stomach, since the amount withdrawn by each successive aspiration should always equal the amount just introduced, namely, 300 c.c. This procedure will be found to be quite superior to the ordinary funnel method of gastric lavage, because it requires less bulky apparatus, is far neater and cleaner, and can be done much more quickly.

Duodenal Intubation.—The procedure of passing a tube into the duodenum is becoming more and more a matter of every-day practice. The object of this manipulation may be experimental, diagnostic, or therapeutic in nature. The most common therapeutic intraduodenal procedures are:

1. Duodenal feeding.
2. Transduodenal flushing.
3. Stimulation of the flow of bile.
4. Introduction of anthelmintics.

The technic of intubation is by no means complicated. The patient must be fasting. Any of the numerous tips or buckets may be employed. The tip can usually be swallowed by the patient without assistance. If there is any difficulty the tip may be taken between the second and third fingers and placed on the back of the patient's tongue. It can then be forced down readily as the patient swallows. A stylet, or wire, though not essential, may help the introduction in some individuals. When the tip has reached the stomach the patient lies on his right side and gradually swallows the required length (about 75 cm.) of tubing. The time at which the tip passes the pylorus is very variable. The position of the tip can best be determined by fluoroscopy, but when this is not available, the following tests may generally be relied upon:

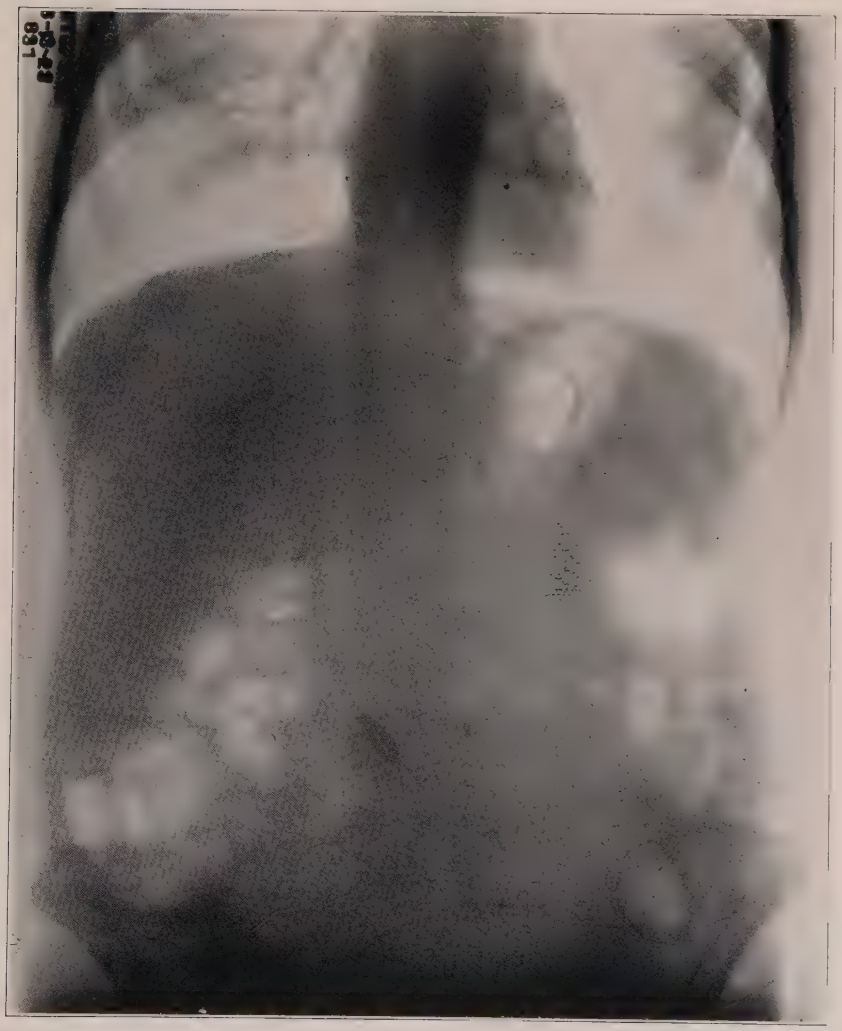

Fig. 5.—Intestinal intubation. Tube through pylorus. Tip well down in second portion of duodenum. Position of tube suitable for the various intra-duodenal procedures: diagnosis, therapy, feeding.

Fig. 6.—Intestinal intubation. Tube through entire duodenum. Tip in upper jejunum. Position suitable for transintestinal flush, but not suitable, for example, for stimulation of bile flow.

Fig. 7.—Intestinal intubation. Tube allowed to pass through entire intestinal canal. Film taken to demonstrate possibility of reaching any desired region of intestine with relatively short tubing. Less than 3 meter-lengths of the Einhorn intestinal tube were used in the above demonstration.

Differential Tests

Bucket in Stomach	*Bucket in Duodenum*
1. Aspiration through the tube withdraws a clear fluid, seldom bile-tinged, generally positive to Congo paper.	1. Aspiration withdraws golden-yellow, viscid bile negative to Congo paper.
2. If a definite amount (say 15 c.c.) of water is injected, and the injection is followed by a syringeful of air to clear the tube, the greater part (more than two-thirds of this water) can be withdrawn on the next aspiration.	2. The water injected flows on into the intestine and but a small amount (less than one-third, if any) can be recovered by aspiration.
3. Injection of air is not followed at once by borborygmi.	3. Injection of air is followed at once (in some cases) by borborygmi.

Drug Therapy.—There is no real necessity for the use of very many drugs in gastrointestinal practice. In fact the simpler and the more direct the therapy the better. For the great majority of cases the following four groups of drugs will meet all the indications:

1. Antacids.
2. Hydrochloric acid.
3. Antispasmodics.
4. General sedatives, hypnotics, anodynes.

To these it may at times be necessary to add a few salines, mineral oil and occasional cathartics and anthelmintics. One can dispense almost entirely with appetizers, tonics, predigested foods and "intestinal antiseptics." It is best to prescribe each drug separately, even when several are simultaneously indicated, because in this way the action of each medicine can be better observed and better controlled.

Physical Therapy.—Active exercises, of the setting up variety, are readily carried out by many patients, and give good results in toning up both the voluntary and involuntary muscular systems. In asthenics, special exercises for increasing the girth of the lower chest are strongly to be

recommended. Physical training under the supervision of careful gymnasium experts may be prescribed to improve nutrition. Exercise with some forms of the Zander apparatus is to be recommended in the physically under-developed.

Exercise is also of value in constipation, in obesity, and in those predisposed to affections of the biliary passages.

Massage has long enjoyed considerable reputation in the treatment of constipation.

Hydrotherapy.—The rational employment of water is of the greatest aid in the treatment of digestive disorders. It is used both internally and externally. When taken internally, in sufficient quantities, pure water performs the following functions: It promotes intestinal peristalsis and softens the feces; it thins the bile and prevents stagnation; it flushes the kidneys and increases skin secretion. Far too little water is drunk by many patients. It is more than likely that many of the good effects derived from spa treatment are due as much to the wetness as to any other quality of the waters consumed in these places.

The principles of external hydrotherapy are simple and should be understood by every doctor. They may be summed up in the following brief proposition: Hot water soothes, cold water stimulates. Thus, the application of moist heat is of recognized value in acute painful spasms, and a full hot bath has been known to cut short many a colic. Similarly, a warm tub bath is a splendid sedative for general restlessness and insomnia.

On the other hand, the stimulating effect of cool or cold water is utilized in the treatment of asthenic conditions. For a general invigorating effect cool rubs, affusions, showers and douches are available. The details of their use will be described in a subsequent chapter.

CHAPTER II

THE GENERAL MANAGEMENT OF FUNCTIONAL DIGESTIVE DISORDERS

Definition and Incidence of Functional Digestive Disorders—Attitude of the Physician to the Patient—Putting the Patient's Mind at Rest—The Value of Rest and Routine—Dietary Indiscretions—Food Restrictions—The Manner of Eating—Tachyphagia and Its Treatment—Drug Therapy—Neurosis in Asthenics—Management of Nervous Excitability and Insomnia

Definition and Incidence.—Functional disorders of the digestive tract may be defined as disturbances of the nerve control of digestion—whether sensory, motor, or secretory in nature—arising independently of gross lesions of the organs involved in the process. The chief interest in this subject ordinarily centers, quite properly perhaps, about the question of differential diagnosis from the organic lesions which these disorders so closely resemble. Once organic disease is ruled out, however, the neurosis is by no means invariably relieved forthwith. Sometimes a cure, even under the best of care, is unfortunately unattainable; but only too often the patient makes no progress, either because of lack of knowledge or of interest on the part of his doctor, or because he is treated in what might be called a spirit of piqued reprisal, as though, having originated his disorder within himself, he ought to proceed to repair it unaided.

And yet there are good reasons why such patients should always receive serious attention. Indeed, by their very numbers they compel consideration. The overfed, the hungry; the overworked, the idle; the genius, the drudge—all help to make up the many-sided picture of functional

digestive breakdown. Wherever there is anxiety, or worry, or remorse, or care, or indeed, any mental anguish, there, among the first of physical failings, is nervous indigestion. In our war-time army, at least one-third of the men hospitalized for digestive complaints suffered from neurosis, while among the civilian population one is always being impressed by the great numbers of functional cases seen not only in dispensaries and private practice, in hospital wards and sanatoria, but unrecognized and uncounted in the crippled and unhappy pursuit of their daily occupations.

To one familiar with these facts it should be self-evident that a fundamental principle in dealing with functional disorders is to treat the patient behind the disease. Whereas, in an organic condition, we focus directly on the organ or lesion in question, in the neuroses, we reverse the binocular, so to speak, add distance to the perspective, and include the whole patient, his mental as well as his physical background, and as much of his environment as is possible. Obviously, it would be futile to attempt to discuss in detail all the possible methods whereby such a plan could be put into practice. Suffice it here to bring out certain general principles underlying the successful management of these neuroses. Let us begin, then, by considering the attitude of the physician to the patient.

Physician and Patient.—Neurotics as a class are sensitive and emotional, and their first impression of the doctor often decides his usefulness to them. Conversely, the management of the patient really begins with his examination, and it is therefore doubly important that the proper note be struck on this occasion. Obviously, the examination must be thorough, otherwise the diagnosis of functional disorder would be untenable. Moreover, it should be comprehensive enough to include any possible defects whose correction would serve to improve not only the physical but the psychic well-being of the patient. If, in addition to

its completeness, the examination is sympathetic and reassuring in manner, the seeds are sown for that welcome feeling of confidence and faith which spells, more than anything else, success in treatment. Once gained, this relationship must be assiduously cultivated by the physician on every occasion. In no other kind of work does and should he so literally minister to his patient, in mind as well as in body.

Putting the Patient's Mind at Rest.—Just as, in organic conditions, we try to spare a diseased part, or organ by rest of its functions, so it is essential, in treating neurosis, to put the patient's mind at rest. In the ordinary simple case this is well accomplished by giving the patient a proper insight into his condition. To tell a neurotic individual that there is nothing the matter with him does not always work. For one thing, it is not true; besides, it is not satisfying. On the other hand, peace of mind through insight "doeth good like a medicine." Many a patient (to say nothing of medical students) has been started on the mend by being told that he has nervous indigestion instead of ulcer of the stomach; and even an unintelligent person can understand and appreciate the difference between trouble due to a broken-down machine (organic disease) and trouble due to a crazy driver (functional disorder).

In the more complicated cases, where the neurosis is due to some cause beyond the power of the physician to control—such as worry over family or money matters—the utility of this procedure may seem more limited. And yet even here it is not without value. Where the relation between cause and effect is not clear to the patient, the result of this knowledge may be sufficient to produce a "psychoanalytic cure" in the manner already described. If, however, the patient has diagnosed his case beforehand, the authoritative confirmation of his views will reassure him, will strengthen his morale, in short, will put him in

far better shape to take advantage of whatever measures—such as sedatives—the physician may employ to help break the vicious circle.

Value of Rest and Routine.—So much for the purely psychic element in our problem. Where the neurosis is brought about by sheer mental or physical overexertion, rest can best be secured by retirement from the harmful occupation, with, when possible, a change of scene and activity. The benefit to be derived from repeated short vacations is not to be overlooked. They should be incorporated in the life habits of every dyspeptic. In the milder cases satisfactory results may be obtained by relaxation after meals, by plenty of sleep (especially in the asthenics), and by simple and regular feeding. In the severer cases, where persistent pain is complained of, nothing short of bed rest may suffice. This, with complete isolation, forced milk feeding, and special re-educative measures, is the method so successfully introduced by Weir Mitchell and some of the French neurologists. In this, as indeed in any set method of treatment, the value of routine cannot be overestimated. The classic neurotic is notoriously unstable, and it is by the practice of consistent hygienic habits that the value of order, poise, and moderation in the conservation of health can most effectively be inculcated.

Dietary Indiscretions and Food Restrictions.—Dietary indiscretions constitute an important factor in the production of digestive neurosis. Perhaps the majority of people, healthy as well as dyspeptic, have learned to avoid food known to be difficult of digestion, such as sour and spicy things, fats, sweets, and the tougher meats and vegetables. Yet there are some who, despite the onset of symptoms, seem never to have acquired this knowledge. Thus, I have before me the record of a woman whose daily bill of fare consisted of coffee and cake at 11 o'clock, oysters at 2, candy at 3, ice cream at 4, and coffee and French pastry at 6. Another lady once told me that as a girl she took every

day at luncheon 1 cupful of vinegar and that she continued this practice for almost two years before it was interrupted.

In contrast to the above, however, it is by no means uncommon to find that the neurotic dyspeptic has eliminated one article after another from his diet not because he has found them to disagree but from some totally extraneous reason. This psychic phagophobia can generally be traced to some popular science article, or fad, or neighborhood gossip, or the ubiquitous advertisement. So impressed are these people with the necessity of self-mortification through dietary restriction that the recommendation of a liberal well-balanced fare is often met with surprise if not with anxious opposition. Such patients should naturally be vigorously taken in hand and be made to retrace their course until they can once more eat with relish and impunity everything that they could handle before the onset of symptoms.

Incidentally, it may be remarked that the manner of preparing the food should also be given some attention, more perhaps than it is ordinarily accorded. Obviously, the best of food can be spoiled by poor cooking. Perhaps the chief sufferers from this cause are those who are forced from reasons of economy or other necessity to "eat out" in the poorer restaurants or "on the road" while traveling for business.

Manner of Eating.—Far more important, however, than the kind of food or its preparation, is the manner in which it is eaten. The plan of eating three meals a day, with breakfast, say, at 8, lunch or dinner at 1, and dinner or supper at 7, has the advantage of allowing a sufficient time to elapse between meals for a reasonable amount of digestion to take place in the intervals. As a matter of fact, the stomach is seldom empty, except before breakfast, but experience shows that the normal individual is quite able to take care of his food on this basis. With meals taken on

time, the digestive tract is aided in carrying on its functions by the factor of routine or habit, as already suggested. Hunger, appetite, satiety, food intake, and waste output recur in their normal regular rotation. So closely linked are the digestive processes that but a single break in the chain may suffice to upset the usual sequence, and this likelihood increases to certainty in the case of the hypersensitive patient.

Other factors than promptness at meals are desirable for the maintenance of good digestion. Everyone knows how food eaten under disturbing or depressing conditions lies heavy on the stomach. Similarly, a preoccupied state, such as that of the business man at lunch time, hardly serves as an aid to digestion. To be sure, the eating of food is in a sense a mechanical process based on habit; yet it is important that proper habits of eating be learned from the beginning—obviously, a job for pediatrists and parents—that these habits be maintained through life, and that bad habits be not developed. A certain amount of attention to the business in hand is essential, therefore, to proper eating, and this cannot be obtained when the individual is preoccupied or hurried. Under such circumstances there arises only too often perhaps the worst and certainly the most intractable of bad eating habits—tachyphagia.

Tachyphagia.—The successful treatment of rapid eating is very often no easy matter. It demands not only patient and persistent attention to detail on the part of the physician but also the serious and willing cooperation of the patient. To begin with, it may be wise to insist on a minimum period of time for each meal, such as three-quarters of an hour for lunch and an hour for dinner. In order to avoid the secondary danger of overeating, a definite amount of food should not be exceeded. A fortunate natural safeguard in this direction exists in the fact that those who have learned the art of careful chewing find themselves satisfied with less food than they did as rapid

eaters. It is well to select those articles which require thorough mastication, such as the drier and more resistent foodstuffs; and drinking of fluids, especially when used, as often, to wash down mouthfuls, should be studiously avoided. In the more obstinate cases it may even prove necessary to provide an attendant to assist the execution of these orders by personal supervision.

Drug Therapy.—A word as to drug therapy. Local treatment, such as with antacids and antispasmodics, is often beneficial and may indeed be necessary, just as one would use direct intragastric measures—lavage or aspiration—when these are indicated. It should not be forgotten, however, that local symptoms tend to disappear as nervous stability is restored to the patient; and that this end can very well be accomplished (so far as medication is concerned) by the use of systemic sedatives, such as bromids, codein, and the somnifacients. Where general hygienic measures cannot well be carried out, as in dispensary practice, and in virtually all cases at the beginning of treatment, these drugs are, indeed, almost indispensable. On the other hand, the use of "tonics" such as strychnin, can hardly be recommended. Whipping a jaded horse is never good practice. It is much better to wait for the renewed strength and vigor that is bound to come from a refreshed and rested mind and body.

Neurosis in Asthenics.—Neurosis in asthenics deserves more than casual consideration. By asthenics we mean those individuals who, owing to their congenitally weak body structure, are at a constant disadvantage in carrying on the affairs of life. Physically they are characterized by the so-called habitus enteroptoticus. The chest is long and narrow, the scapulæ are winged, the ribs flare down, the subcostal (epigastric) angle is acute, the xiphoid process is soft, thin, and receding, or quite impalpable, the tenth ribs are floating (Stiller's sign), the waist is narrow, the hips disproportionately wide. When standing, the whole

body slouches, the shoulders are thrown forward and the lower abdomen is prominent.

Corresponding to this external body form the viscera assume characteristic shapes and positions. The heart is of the median or drop type; the stomach and colon are long and reach low into the pelvis; the kidneys and liver, and not infrequently the spleen, are ptosed and palpable. There is diminished intraabdominal pressure and a widespread atony of the hollow viscera. Prominent among the many subjective symptoms is a sense of weight or dragging in the stomach, and of pain in the back, whereas the general sluggishness of visceral function is well illustrated by the almost universal "chronic" constipation.

Such individuals feel always weak and tired, and they fatigue still more on the slightest exertion. If questioned, especially, as to their sleep requirements, it will be found that they need nine, ten, or more hours of repose nightly, instead of the generally accepted eight-hour average for "normal" people. When, as often happens, they are mentally active and ambitious, they feel their physical incapacity as a particularly bitter affliction. In short, though not sick enough to give up entirely, they are not well enough to "carry on" as they would wish; and being often misjudged and "misunderstood" they are very likely to become increasingly wretched and despondent. Once the essential nature of this disability is grasped, the principles governing its treatment become obvious. Radical reconstruction would suggest itself as the ideal procedure, and indeed something can be done in the way of changing the shape of the body. Special developmental exercises have been shown to be of value in widening the capacity of the lower thorax; a rugged outdoor life with complete freedom from care may accomplish the same purpose. But these are methods that are available to but few, and the results are distant. What the average asthenic wants is immediate relief from special symptoms. Besides, only too often, he

must keep on working. In such cases, then, it is best to accept the disability as a fact, certainly for the time being. An immediate estimate should be made of the patient's reserve and he should be ordered to keep his activities well within his limits. Especial attention should be given to the question of sleep, as already suggested, and, in fact, as much rest as possible should be taken in the recumbent posture, inasmuch as ptosis and its symptoms tend to disappear when the patient is reclining. Whenever possible, complete bed rest for at least two weeks should initiate the treatment; and with this should be combined forced feeding, efforts to correct the ptosis, hydrotherapy and other measures, which will be described in the next chapter.

Nervous Excitability and Insomnia.—It often happens that even in well-built and well-nourished individuals one meets with a constant restlessness and excitement, a continuous hyperactivity of both mind and body that gives rise not only to various digestive complaints but interferes greatly with all effective effort by day and particularly with sleep at night. Insomnia is indeed ofttimes the outstanding disability. In these cases all that has already been said as to the enjoinment of rest and relaxation applies most strictly; and the use of systemic sedatives, such as bromids, codein, and the somnifacients, is also in order. The remedy par excellence, however, is hydrotherapy. Either the cool wet pack or the warm tub bath may be made use of, preferably at bedtime. The former procedure is carried out as follows:*

Two large woolen blankets are spread over a rubber sheet on the mattress. A linen sheet, wrung out of water at a temperature of 70° F. is laid over the blankets. The patient is then put on the sheet with his arms raised alongside his head. One-third of the sheet is drawn across the chest. The arms are now lowered alongside the body and

*The descriptions of technic are based on Baruch: An Epitome of Hydrotherapy, Philadelphia, W. B. Saunders Co., 1921, p. 54, ff.

the other two-thirds of the sheet are brought across the body covering the arms but leaving the latter separated from the trunk by the intervening sheet. The lower part of the latter is pressed between the thighs and legs and the lower border tucked under the heels. The blankets are finally drawn closely over the body and tucked carefully around the shoulders and feet. In this way the patient is wrapped up like a mummy and all air is completely excluded from his body. The patient is allowed to sleep in the pack and is dried gently on awakening.

The warm tub bath should be given at a temperature of 100° to 102° F. If the temperature is below or above it will be too stimulating. The patient should be wrapped in a warm sheet as soon as he emerges from the bath and should be put to bed between warm bath sheets and finally dried with warm towels lying in bed. He should not be allowed to sleep with hot water bags, as these might excite perspiration and thus defeat the object of treatment.

CHAPTER III

TREATMENT OF PTOSIS AND THE ASTHENIC STATE

General Management—Fattening Cure—Physical Exercise—Hydrotherapy—Physical Reconstruction—Abdominal Support—Management of Special Conditions: Atony, Constipation, Associated Neuroses—Operations in Asthenics

It is quite impossible to treat gastrointestinal diseases successfully without being thoroughly conversant with the principles underlying the management of ptosis and its associated conditions. Until very recently the subject of ptosis has received but scant treatment in textbooks, or else it has been handled in a sort of off-hand way, as if it were one of the rare and unusual diseases. As a matter of fact, of course, ptosis is not a disease at all—and this may explain the embarrassment with which the subject has heretofore been approached—but it is a very common form of inferior physical make-up met with in every day experience. Anywhere from one-seventh to one-third of the "gastrointestinal" cases seen in private or dispensary practice have one or more of the earmarks of visceroptosis. The mere sight of a narrow body with obvious malnutrition should at once suggest to the physician the presence of long, low-placed organs characterized by more or less atony and sluggish functions; in short, a condition of universal asthenia (see page 40 ff.). It is now well known that such a state of affairs may exist and cause no end of symptoms without any organic disease being present. On the other hand, the asthenic habitus may complicate some other condition, such as tuberculosis or gastric ulcer, or a severe intestinal neurosis. In any case, treatment of the ptosis as such is always in order.

General Management.—For practical purposes the asthenic individual may be considered as being in a state of chronic fatigue or exhaustion; as one who, having used up

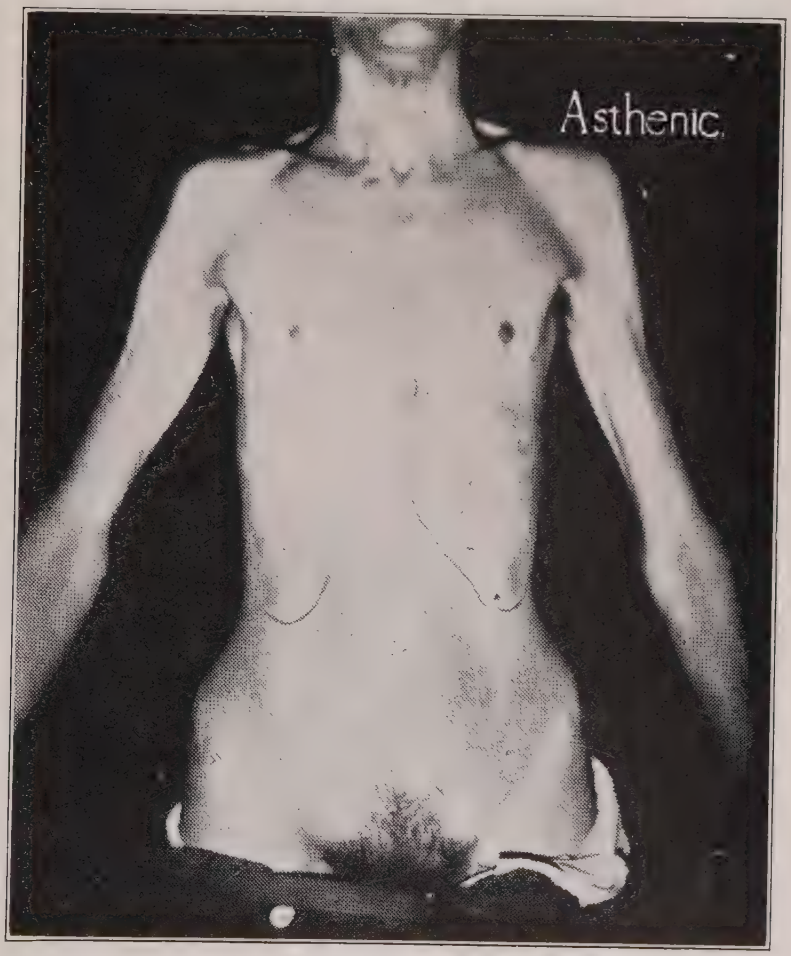

Fig. 8.—Asthenic habitus. Photograph of patient (after Mills).

his "normal excess" of strength, is living on his reserve. The primary indication, therefore, is rest, both mental and physical. It is well to make clear to such a patient that he is carrying too big a load for a frail body, and that he

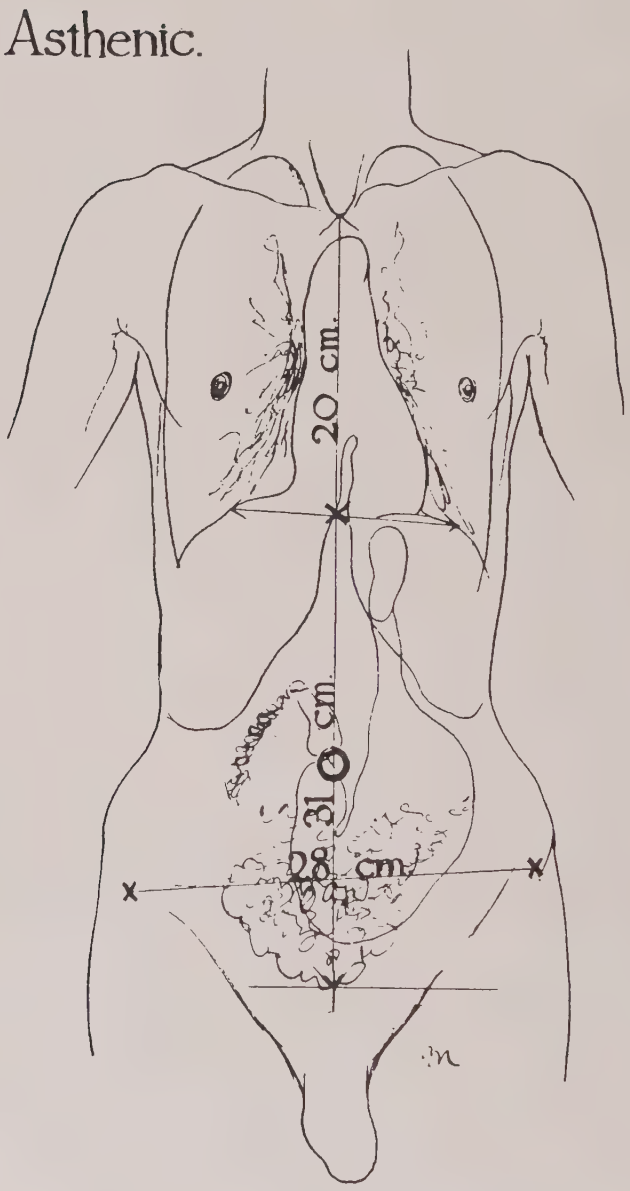

Fig. 9.—Asthenic habitus. Orthodiagraphic study of subject of preceding figure (after Mills).

Fig. 10.—Ptosis aud atony of stomach.

Fig. 11.—Ptosis and atony of stomach. Condition more marked than in Fig. 10. Note characteristically elongated stomach bubble (arrows).

should make every effort to reduce to a minimum all unnecessary burdens and responsibilities. The question of securing sufficient sleep is of the first importance. The asthenic individual requires from one to three hours more repose than the average person. Practically, no less than nine hours should be accepted as the minimum sleeping period, and all the patient's activities should be planned in conformity with this requirement.

Whenever possible, a period of rest in bed for at least two weeks should initiate the treatment of a case of ptosis. By this means a three-fold purpose is served:

1. Both body and mind secure a much-needed relief from fatigue.

2. The displaced organs are automatically lifted and their function is correspondingly improved.

3. It is easier to improve the state of nutrition because the same amount of food goes further under conditions of bed rest than when the patient is up and about.

Some authors recommend raising the foot of the bed during the cure, but this procedure is by no means essential.

The practice of making external applications of heat to the abdomen is a good one. Either an electric pad or warm moist compresses may be used. The application may be constant over the twenty-four hours, or else it may be restricted to the first few hours after meals.

Unless there is some very special contradiction, a bed rest cure should invariably be combined with a fattening cure to be described directly.

Fattening Cure.—The first indication in the active treatment of any case of ptosis and malnutrition is to overcome the diminished intraabdominal pressure and the drag and malfunction of the displaced viscera. Temporarily this can be accomplished to a certain extent by external support, as will be described later. Surgery has been tried and has been found wanting. The only hope of permanent improvement lies in (1) increasing the intraabdominal fat

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bolster by means of a fattening cure, and (2) improving the configuration of the body by means of special exercises.

A fattening cure is always best carried out in an institution where expert professional care is available. The nurse should be held absolutely responsible for serving the meals on time, keeping a strict record of all food ordered and eaten, and above all, forcing the feeding. It ofttimes happens that patients protest that they "cannot take so much nourishment," that the food "goes against" them, that they never were "big eaters." In all such cases it may be found advantageous to explain carefully that a chronically underfed body seldom craves food; that if the appetite had been big the patient would never have been undernourished; that the food must be taken first, with an effort, like medicine, before enough new body cells are added to crave the extra nutriment; and finally that, after the first few pounds are gained, the appetite will be bound to grow in a way that no artificial appetizer could possibly make it.

Perhaps the simplest way to go about feeding up a patient is first to find out exactly what and how much he has been eating. If his selection is reasonably satisfactory, his own menu may be adopted as the minimum intake for his three regular meals of the day. If, for any reason, the selection is not satisfactory, the patient should be put on a basic standard bland diet, such as will be described in a subsequent section (see page 74). Between meals and at bedtime extra nourishment should be ordered, the usual hours selected being 10 A. M., 4 P. M., and 10 P. M. This nourishment ordinarily takes the form of milk or some milk modification.

A few details may not be out of place as to the use of milk in forced feeding. There is no question that this substance is one of the most nutritious obtainable. Some patients, however, claim that they cannot take milk. They may say, for example, that milk makes them constipated,

or that it causes diarrhea, or that it produces nausea or that it "sours on the stomach," or brings on gas, or distress, or some other neurotic symptom. It is quite possible, of course, that milk in some form does disagree with the patient. There is no reason, however, why some other untried form may not be quite satisfactory; and the number of milk modifications is almost unlimited. Thus, if cold milk disagrees, hot milk may be taken without any difficulty whatever; or the milk may be given sour in the form of Fermillac, Kumyss, Zoolak or Yoghurt; or it may be modified with lime or seltzer water, or taken with ice as a milk shake with or without flavoring of cocoa, vanilla, or coffee. Egg-nogs and custards also contain milk and are highly nutritious. Besides eggs, other things may be added to milk to increase the caloric content. Lactose can be readily administered in this way in substantial quantities without perceptibly changing the taste, and hot milk and butter is by no means an unpalatable combination. Where nausea and vomiting are complained of Delafield's mixture may stay down where nothing else will.

℞
Cream
Milk
Water, aa q. s. ad 0 i
Cerium oxalate, gr. x
Sodium bicarbonate, gr. xx
Sig. Keep on ice. Administer cold.

As already mentioned, the actual choice of foods at the three regular meals can be left largely to the taste of the patient with the understanding that a definite minimum of food intake should be established and every effort made to increase still further the caloric value of the diet. In this regard the most satisfactory, in the sense of highly concentrated foodstuffs, are cream and butter. The former can be used in the morning with stewed fruit, cereals and coffee, and at lunch and dinner with desserts of various

kinds. Butter can be taken in surprisingly large amounts with fresh hot toast, with crackers, or with cereals; or with potatoes, peas and other similar vegetables; or else, as a sauce, with meat and fish. A daily minimum of a quarter of a pound of butter should be begun with, and the amount increased as far beyond this as possible.

A fattening cure, as above described, should be persisted in until the restoration or attainment, as the case may be, of the normal weight for the particular sex, age and height of the patient in question. If the normal figures can be exceeded by five or ten pounds, so much the better. Any gain beyond this point, however, is not likely to be permanent, and is, on general principles, undesirable.

Physical Exercise.—Just as soon as an appreciable gain in weight has been made, and when the patient is well rested, it is wise to begin active exercises. The idea of this plan is to replace the intake of food through forced effort, by a more natural craving for food, based on a vigorous, physiologic stimulation of appetite. Experience has shown that when a proper amount of muscular exercise is combined with a fattening cure, not only does the gain in weight progress without diminution, but the flesh put on is more likely to "stay with" the patient after the cure is over than would otherwise be the case. Just when these exercises may be begun varies, of course, with the progress of the individual, but ordinarily a start may be made by the end of the second week. The exact type of exercise chosen may be left largely to the inclination of the patient. Those who have engaged in athletics may indulge moderately; others may practice exercises or walking, or do light work in a gymnasium. In any case it is of prime importance that the point of fatigue be avoided and that only the stimulating effect be made use of.

Hydrotherapy.—For the general toning up of the asthenic individual—increasing his appetite, enhancing his weight, improving his peripheral circulation, restoring his

ambition and energy, and promoting his general sense of well-being—physical exercise can be very advantageously combined with tonic hydrotherapy. The latter treatment can be carried out at home almost as well as in special hydrotherapeutic institutions. The basis of the tonic treatment is the application of water at increasingly cooler temperatures to the body surface. It is well-known that whenever cold water is applied to the skin, the body tends to respond by a characteristic "reaction." This reaction consists in the contraction of the cutaneous blood vessels, in increased cardiac action, in deepened respiration, and in heightened activity of the voluntary muscles. By gradually increasing the stimulus (i. e., diminishing the temperature of the water), the patient can be put through a systematic course of autonomic and neurovascular training.

In the actual practice of tonic hydrotherapy the following practical considerations should be borne in mind:

1. The temperature of the water, the duration of the treatment, and the accompanying pressure (or amount of friction) should always be clearly and definitely indicated.

2. Before beginning a treatment the patient should always feel comfortably warm. This condition may be produced where necessary, by extra coverings, by friction, by hot water bags, or, where available, by the use of a heating cabinet. For asthenic patients, a stage of free perspiration, however, should be avoided.

3. Whenever water is applied at a temperature below that of the body (98.6° F.), it should always be accompanied by friction or by increased impact (pressure).

4. A poor reaction—characterized by chattering of the teeth, actual rigor, and cyanosis—should be avoided.

5. If, on reaching a given low temperature, a good reaction is not obtained, the temperature of the water should not be increased at the next treatment, but the duration and the amount of stimulus should rather be diminished.

Among the most commonly employed tonic measures we have the following:

The *cold rub*.* If the patient is much debilitated or is confined to bed this can be carried out by an attendant. The patient is laid with arms outstretched upon two blankets. The first is snugly wrapped about the body and between the legs. The arms are now placed alongside the body and the second blanket is tucked around the patient so that the upper corners are firmly fastened under his shoulders and neck and the lower edge folded under his feet. The patient having lain from one-half hour to an hour and thus accumulated heat, his face is bathed in water from 70° to 90° F. The blankets are now successively opened over the chest, abdomen, back, lower extremities and arms, and these are, in turn, bathed by rubbing with a linen wash cloth and each part is immediately dried and replaced under cover. A general dry rubbing with a woolen cloth or the hand follows, and the patient is then made to take some exercise if he is able to do so. Otherwise he remains in bed and receives some warm liquid food. This treatment is best given in the early morning hours and is repeated with lower temperatures and increased duration.

In ambulant cases the patient strips to the waist and wraps a towel around the latter to prevent water flowing down. Dipping the middle of a linen towel into water at 90° F. (daily reduced one or more degrees till a temperature of 70° F. is reached) the towel is held with the right hand above and the left hand below and is drawn diagonally across the back with long passes. It is dipped again and passed over the back in the opposite direction. This is repeated once or twice. The entire towel is now dipped and wrung out, and with it the chest is rubbed. The patient is dried and goes out of doors, no matter what the weather. The stimulus of the fresh air enhances the deep respirations begun by the shock of the cold water.

The *cold affusion* or *cold shower*. Where no shower is

*This and the following descriptions of procedure are taken, somewhat modified, from the work of Baruch, already cited.

at his disposal, the patient sits in a tub and water at 90° F. (daily reduced one degree to 70° F.) is poured out of a pitcher or basin successively over the chest, back and sides of the patient; or he may himself squeeze water out of a sponge over these parts. Where a shower of either the overhead or the needle type is available, the water may be turned on, at first warm (about 100° F.) and then quickly reduced to the temperature designated. In the more robust individuals the preliminary warm shower may be omitted.

In hydrotherapeutic institutes the *cold douche* is a great convenience. The patient stands ten feet from the douche nozzle. The treatment begins with water sprayed over the body at a temperature of 90° F., for ninety seconds, at twenty pounds pressure. The pressure and duration remaining constant, the temperature is reduced one degree a day till 70° F. is reached. Thereafter the duration is increased ten seconds or more daily until a five minute treatment at 70° F. can be given with good reaction. Dry friction follows, the patient dresses and goes out of doors. Baruch found by actual experience that when patients can react without assistance from the attendant and without a preceding hot air (cabinet) bath to low temperature (70° F. to 80° F.) and to two or more minutes' duration, the instability of functional neuroses disappears in many cases.

Radical Physical Reconstruction.—It may prove of distinct value, particularly in younger individuals possessing the pronounced asthenic or ptotic habitus, to institute a course of special developmental exercises. The object of these is nothing less than a radical reconstruction of the body framework, with the end in view of improving the posture and, indirectly, the position and function of the body viscera. Dr. John Bryant (to whom we owe the best exposition of this method of treatment) has shown in his studies on "the congenital visceroptotic invalid" that the loose viscera depend chiefly for their support on the activity of the lateral abdominal muscles; that these muscles

are most efficient only when working from lower ribs held firmly at or near full expansion, a condition which also enlarges the upper abdominal cavity; that elevation of the lower ribs implies contraction of the intercostal muscles and is greatly facilitated by erect posture with arching of the back; and that erect posture depends upon proper activity of the erector spinae group of muscles. With these principles in mind Bryant undertakes to remould the asthenic torso by means of carefully graduated active exercises involving, in turn, (1) the erector spinae group of muscles, (2) the respiration group of muscles, and (3) the abdominal group of muscles. For details of exact technic the reader is referred to the original article.*

The following extract is taken from the description of the respiration group of exercises:

"The patient reclines flat upon back with legs extended. The instructor places his hands over the lower free ribs on either side, and tells the patient to push his hands out by the force of his respiration. This soon localizes the respiration, and one may demonstrate to the patient that these same ribs may be 'sprung' outward by muscular effort alone without any inspiration, and that by the same muscular effort these same lower ribs may be kept constantly in this expanded position of full inspiration. The next question from the patient invariably is, 'Where shall I breathe, then?' The answer is, 'In the epigastrium with your diaphragm.'

"With the lower thorax in full expansion the instructor places his hand upon the epigastrium and makes the patient take a series of very short rapid breaths with mouth wide open. The intercostals have no time to act; immediately the respiration may be made less rapid and deeper, and the patient soon has learned that he can get all the breath he can use in this manner (i. e., by diaphragmatic respiration only)."

*Bryant, J.: Developmental Exercises for the Chronic Intestinal Invalid, Transactions American Gastro-Enterological Assoc., May, 1918, St. Louis, 1919.

The above exercises may be combined with the active and passive employment of special forms of the Zander apparatus, which have been devised for the expansion of the lower chest and the correction of the posture.

Abdominal Support.—Abdominal support is indicated in every case of ptosis and it should be continued uninterruptedly, except for the time actually spent in bed, for just as long as it gives relief from symptoms. This may mean indefinitely in many cases, particularly in those, unfortunately in the majority, who cannot afford so thoroughgoing

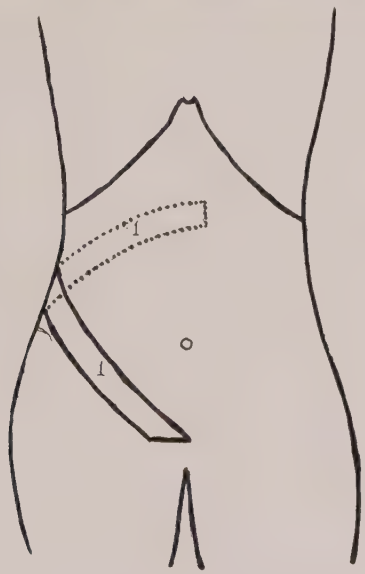

Fig. 12.—Adhesive strapping for ptosis. Application of first strip.

a program of reconstruction as is provided in a course of bed rest, fattening cure, and corrective exercises.

The relief obtained from abdominal support is to be attributed to the lifting of the ptosed organs and to the increase in intraabdominal pressure. This is accomplished by any means that will compress the lower abdominal wall back against the spine, thus forcing the abdominal organs out of the pelvic cavity. There are three practical methods

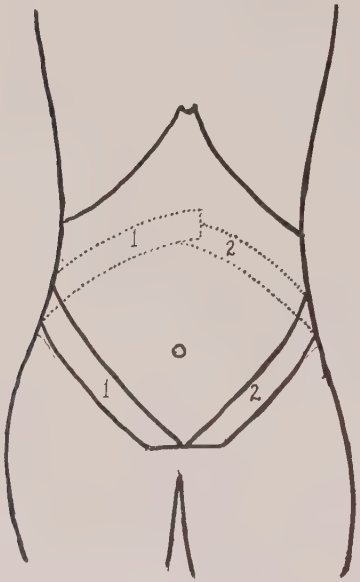

Fig. 13.—Adhesive strapping for ptosis. First two strips in position.

Fig. 14.—Adhesive strapping for ptosis. First two strips in position. Rear view.

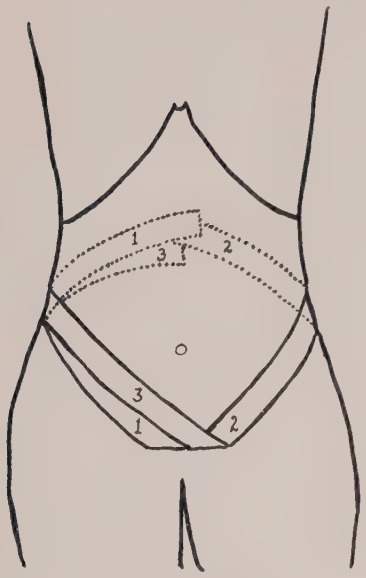

Fig. 15.—Adhesive strapping for ptosis. Application of third strip.

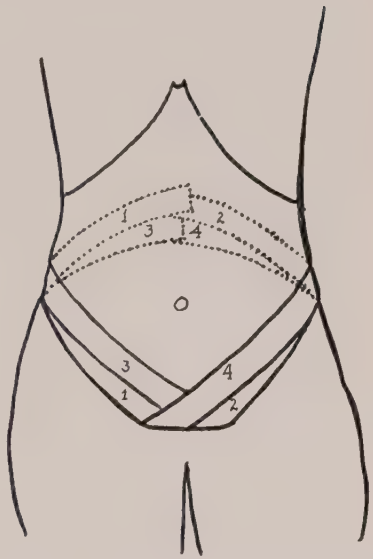

Fig. 16.—Adhesive strapping for ptosis. First four strips in position.

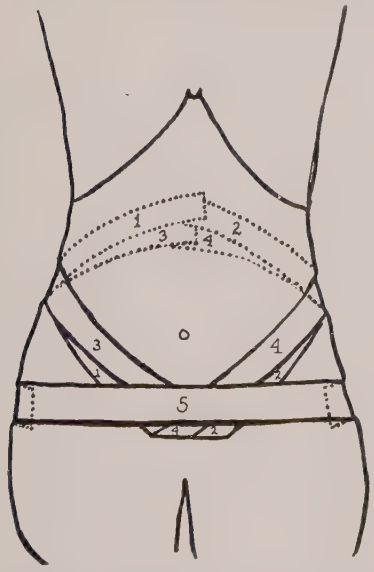

Fig. 17.—Adhesive strapping for ptosis. Bandage completed. Front view.

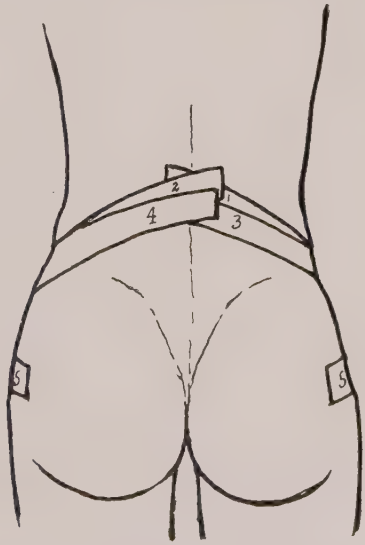

Fig. 18.—Adhesive strapping for ptosis. Bandage completed. Rear view.

Fig. 19.—Abdominal binder for ptosis. Showing thigh straps. Front view. (Courtesy Abdominal Supporter Co., New York.)

Fig. 20.—Abdominal binder for ptosis. Showing thigh straps. Side view. (Courtesy Abdominal Supporter Co., New York.)

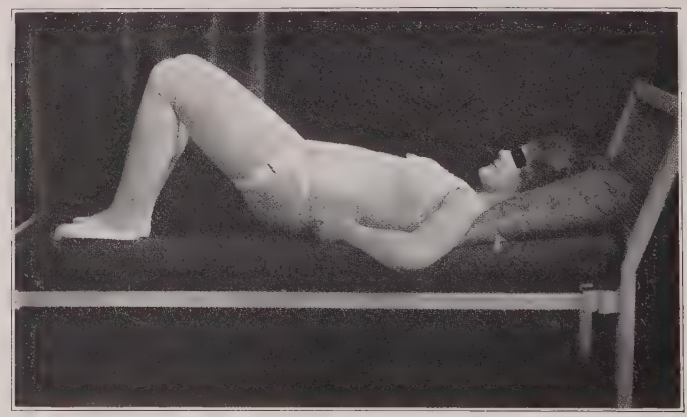

Fig. 21.—Abdominal binder for ptosis. Showing method of adjusting abdominal binder or corset. Patient on back, hips raised. (Courtesy Abdominal Supporter Co., New York.)

for accomplishing this end, viz.: adhesive strapping, binders, and corsets. These must all be applied with the patient flat on his back, the organs being restored in this position to their normal level.

Adhesive strapping has the advantage over the other forms of abdominal support in the speed with which it can be applied, and in the fact that when skilfully handled it probably gives better uplift than the other methods. Its value, therefore, lies in its usefulness as a therapeutic test, and in its service as a measure of emergency relief. Unfortunately the adhesive support loosens quickly and is, be-

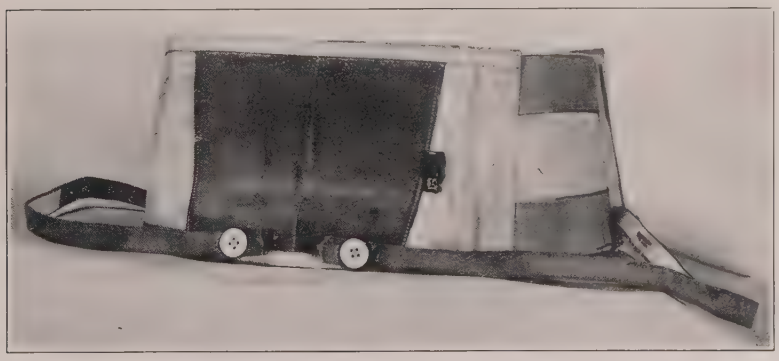

Fig. 22.—Abdominal binder for ptosis. Showing bent-in metal plate incorporated in front of binder. (Courtesy of S. Eitinger, New York.)

sides, a great strain on tender skins. For these reasons the life of an adhesive bandage seldom exceeds ten days or two weeks.

A simple and satisfactory support of this kind has been devised by Dr. I. H. Levy. It can be made as follows: Strips of adhesive plaster are used, each, except the fifth, approximately 2½ inches wide. Four of the strips should be 16 to 20 inches long, depending upon the size of the patient; the fifth should be 14 to 16 inches in length and about 3 inches wide. The patient should be placed supine upon the table, the pubic hair shaved dry, and the skin carefully wiped free from moisture. Before and during the applica-

tion of each strip the patient should keep his abdomen drawn in as far as possible. The first strip is applied at the pubic level just to the right of the midline, and is car-

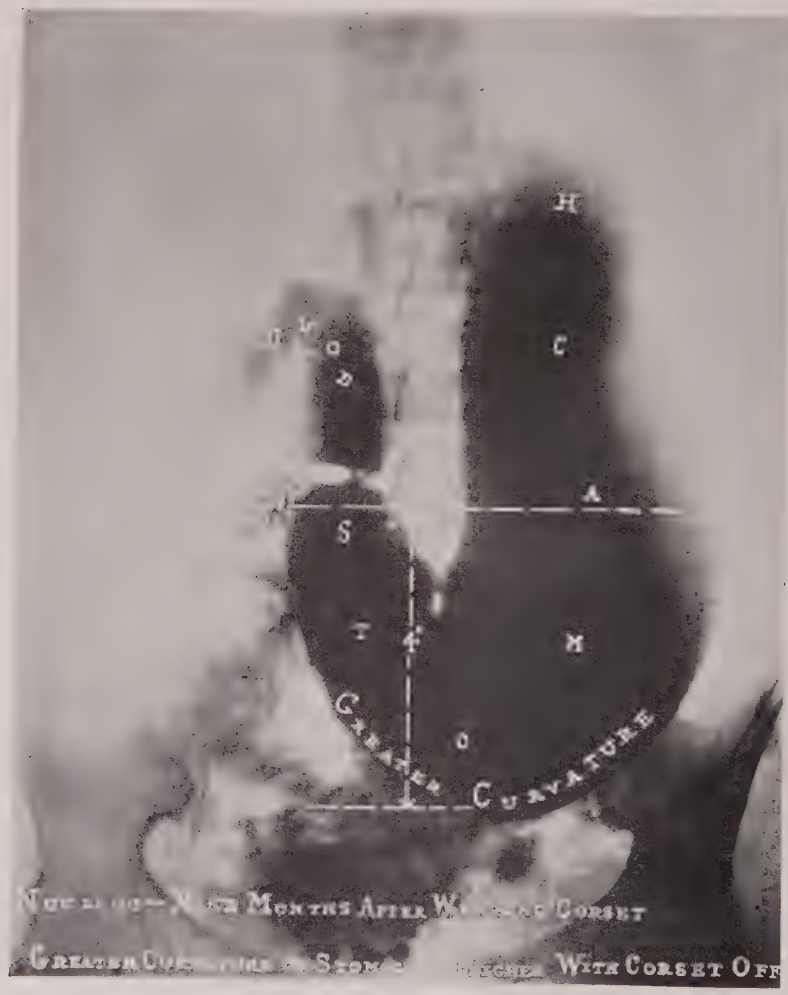

Fig. 23.—Position of stomach before application of corset. Compare with Fig. 24. (Courtesy Barnum-Van Orden, New York.)

ried obliquely up and out over the crest of the right ilium around the small of the back, ending to the left of the spine. The patient assists by slowly twisting around in the oppo-

site direction, keeping the abdomen well retracted during the whole procedure. The second strip is applied in the same manner as the first, but on the left side. The third

Fig. 24.—Stomach supported by corset for ptosis. Same case as Fig. 23. (Courtesy Barnum-Van Orden, New York.)

strip is applied over the right side as was the first, but pursues a more horizontal course and is begun at the opposite (left) side of the pubic arch. It crosses the first strip at

the lateral abdominal wall and winds up at the left of the spine at a slightly lower level than the first strip. The fourth strip is applied similarly over the left side, beginning at the opposite (right) side of the midline. The fifth (last) strip is pulled tightly straight across the lower abdomen from the level of one trochanter to the other. This completes the bandage. The general effect, it will be observed, is to suspend the weight of the lower abdomen from the spine behind. It is important that the strips be laid flat and that wrinkling of the skin be avoided.

Binders and corsets should never be taken from "stock," but should be carefully made to order for the individual wearer. As already emphasized, they should never be put on in the standing position. Binders have the advantage of being relatively light and inexpensive, but will slip up when the patient moves about unless prevented by proper adjustments. Perineal straps or thongs are objectionable. The best models have flaps coming down over the thighs in front and connecting with an adjustable strap encircling each limb at the crotch. If the abdomen is flat a pad may be worn with comfort, or better, a bent metal plate may be incorporated in the front of the binder, thus increasing the inward pressure and at the same time relieving the strain on the prominent iliac spines of these very thin patients.

A corset has the advantage over a binder of combining considerable style with elevation of the ptosed viscera. The choice between corset and binder can often be left to the individual patient. One point is of importance. Inasmuch as practically every ptotic patient feels immediate relief of symptoms and a sense of well-being and increased vigor from the application of abdominal support, persistent complaints of discomfort should suggest to the physician (1) some technical error in the fitting of the appliance, or (2) the presence of visceral adhesions preventing the free uplifting of the organs.

Management of Special Conditions.—(a) *Atony.* In all asthenic states the hollow viscera tend to partake of the general atonic condition. The stomach, for example, shows considerably impaired peristole. If the emptying time is much delayed—though, of course, never so much as in organic obstruction or severe spasm—appropriate changes in diet are indicated. The principle of frequent small dry meals is the one to follow, the meals being small to prevent stretching of the weakened stomach musculature, and dry, that is, concentrated, for the same reason. From four to six meals are generally given, depending on the conditions in the particular case. Great care must be exercised to secure adequate mastication. Fluids should never be taken with meals, but a glass of water or milk may be taken an hour or less before eating, best of all before breakfast, in the hope that most of the fluid will have left the stomach by the time the solid food is ingested. As an additional therapeutic measure, gastric lavage or aspiration is often of great value, particularly if there is any tendency to the accumulation of food residues. For further indications and details of technic the reader is referred elsewhere (see Chapters I and VII).

(b) *Constipation.* Persons of the asthenic habitus are much more likely to be constipated than are more stocky individuals. Many asthenics have developed a full-blown cathartic habit. It is very important, especially when carrying out a fattening cure, that cathartics be done away with in order to eliminate the frequent watery stools and inevitable drops in weight associated with constant purgation. In some cases there may be difficulty in persuading a patient that he will survive a few days of preliminary discomfort. Such a one should be reassured that his constipation will automatically disappear as he becomes fatter, and the position and tonus of his colon becomes restored to normal. As a matter of fact, it is by no means necessary that the bowels be opened daily from the beginning of

treatment. If, however, some special need should arise, a suppository or small enema, preferably of oil, will usually suffice for the purpose.

In a great many cases the mere wearing of a supporter and the adoption of a strict regimen of feeding will bring about the establishment of regular evacuations. In others, the consumption of coarse, residue-containing foods is indicated; and in general the free drinking of water on an empty stomach, as before breakfast, is highly beneficial (see Chapters VIII, IX and X).

(c) *Associated Neuroses.* The association of various neurotic manifestations with the asthenic habitus is one of the commonplaces of medicine. Indeed, it is not surprising that a weak organism should be, at the same time, irritable and unstable. It is not necessary to repeat here what has already been said (see Chapter II) concerning the therapy of the digestive neuroses. Suffice it to reiterate that sedative measures are strongly indicated and that these should include not only drugs, but a reasonable amount of psychotherapy as well. Of the drugs, the general sedatives act best, the most useful being bromids and the somnifacients.

Operations in Asthenics.—A great therapeutic gain would result if it were universally realized that asthenics as such should not be operated upon. There is no question that in the past any number of useless—and by no means harmless—surgical interventions have been made on the false assumption that symptoms essentially associated with the asthenic condition could be relieved by surgery. The most common of these unfortunate operations have been of three kinds: (1) attempts to change the position of ptosed organs by pexies of various sorts: gastropexies, colopexies, nephropexies; (2) attempts to improve the emptying or "drainage" of atonic organs by gastroenterostomies or by various short-circuiting operations on the colon; (3) attempts to relieve atypical symptoms referable to the right lower quadrant by appendectomy. Such procedures are to

be deplored not only because of the mortality risk involved, slight as it may be in some cases; not only because of the danger of further deforming a weak mechanism by ill-advised efforts at improvement, or by the development, in susceptible individuals, of postoperative adhesions; not only because of the likelihood of fixing, perhaps for life, a severe neurosis, but chiefly because of the ignorance revealed by responsible physicians and surgeons of the essential nature of the malady from which the patient suffers. Fortunately there is every indication that the day of this type of surgery is rapidly drawing to a close.

CHAPTER IV

TREATMENT OF THE SYNDROME OF "GASTRIC IRRITATION"

DEFINITION — GENERAL MANAGEMENT — DIET — DRUG THERAPY: ALKALIES, GENERAL SEDATIVES, LOCAL SEDATIVES AND ANTISPASMODICS—TREATMENT OF SPECIAL CONDITIONS: HYPERSECRETION, CARDIOSPASM, PYLOROSPASM

It frequently happens in medicine that one is called upon to treat symptoms or an entire syndrome before it is possible to make a differential diagnosis. This is obviously the case at the onset of many acute infections. It is likewise true in digestive diseases, where the stomach may respond by a syndrome of irritation to divers conditions originating either within this organ or elsewhere in the body. This condition of gastric irritation—which may familiarly be called the "hyper" syndrome—is associated with one or more of the following disorders of gastric physiology:

1. Hyperacidity or hyperchlorhydria.
2. Hypersecretion.
3. Hypertonicity, which may lead to spasm of the orifices.
4. Hyperperistalsis.
5. Hypermotility, i. e., rapid gastric emptying, whether initial or total. This may coexist with delayed emptying due to pylorospasm.

The symptoms of this syndrome are those generally understood under the older and narrower concept of "hyperacidity," and are, commonly: epigastric distress, weight, or fulness after meals; hunger distress or pain; heartburn; belching or regurgitation; occasionally vomiting.

The underlying causes that produce this syndrome may be any of the following:

1. Instability of the autonomic nervous system, now often spoken of as "vagotonia," a pure neurosis.

2. Lesions within the stomach or duodenum, such as ulcer or cancer.

Fig. 25.—Hypertonic stomach.

3. Lesions in the digestive tract outside the stomach and duodenum, such as gallstones and constipation.

4. Lesions outside the digestive tract, as in the genitourinary or cardiovascular system.

Fig. 26.—Hypertonic stomach. Marked hypertonus in a case of hour-glass stomach. Lower pocket not shown in this view.

Fig. 27.—Gastric hyperperistalsis. Note deep-cutting waves on greater curvature. Compare with Fig. 29.

Fig. 28.—Gastric hyperperistalsis. Condition limited to antrum of stomach. A common picture.

It is a matter of everyday experience that at one stage or another, but more likely early in the disease, the treatment of all of the conditions just enumerated may be limited for practical reasons to overcoming the syndrome of gastric irritation. In other words the treatment is essentially the same no matter what the underlying pathology. This does not mean, of course, that this kind of therapy will suffice to cure the disease or that a real causal therapy should ever be neglected. It is simply a matter of fact that the more far-reaching line of treatment is often inapplicable either because of the necessity of a prolonged period of observation or of the inadvisability of immediate radical treatment. Under such circumstances, then, a rational palliative therapy is a practical necessity.

General Management.—The importance of rest to a diseased or irritated part or organ is now generally acknowledged. Rest of the digestive tract can be applied in three ways: rest through peace of mind, rest through bodily repose, and rest through the elimination of irritants from the dietary. It is well known that nervous influences affect the digestive function not so much through the power of the will, as through the play of the emotions. Everyone knows the effects of intense love or hate or anger, the shock of surprise, the strain of long continued, unremitting worry. The latter is particularly important in the production and maintenance of digestive derangement. Every effort should be made to secure an equable frame of mind as a basic factor in treatment. If, for any reason, this cannot be accomplished, the relation between the mental state and the digestive process should be carefully explained to the patient, for in this way at least the accompanying vicious circle—worry over the physical condition, causing more indigestion, which, in turn, causes more worry, and so on —can best be broken.

Rest through peace of mind is perhaps best applied where the gastric irritation is due to or associated with a

pure neurosis such as vagotonia. In this condition the autonomic nervous system is regarded as being in a state of congenital, irritable instability. This, in turn, is responsible for the disturbance in gastric physiology in a large number of persons who have no organic disease whatever. Whether or not an organic lesion such as that of ulcer, for example, may result from the long-continued effects of this predisposition, is still a matter of speculation. Such a contingency seems well within the realms of possibility. At any rate, the benefits to be derived from the utmost possible reduction of mental strain in individuals of this type are beyond question.

That actual bodily rest greatly relieves the symptoms of gastric irritation would appear to be almost axiomatic. Yet this simple and obvious form of treatment is—largely because of the patient's inherent dislike to give up his work—long delayed or quite neglected. As a matter of fact, however, it should never be forgotten that many or all of the symptoms of gastric irritation, pain, vomiting, heartburn, and the rest, may be immediately and completely brought under control just as soon as bed rest is ordered. Bed rest may be absolute or it may be limited to the period of one or two hours immediately following meals.

Diet.—In gastric irritation the diet should be bland and nutritious. A specimen form is given herewith:

Diet in Gastric Irritation

"Standard Bland Diet"

Breakfast:

Eggs, boiled or poached.
Cereal.
Milk.
Bread or toast and butter.
Coffee, if allowed.

LUNCH AND DINNER:

Meat: Broiled steak, roast beef, lamb, mutton or chicken (broiled, boiled or roast).

Fish: Baked, broiled or boiled.

Vegetables: Potatoes, peas, squash, cauliflower, asparagus tips (well cooked or mashed). Later: Carrots, beets, beans, spinach, macaroni.

Bread or toast and butter.

Desserts: Gelatin jelly (Jell-O). Tapioca, rice, stale bread, or cornstarch pudding. Custard. Ice cream. Stewed prunes. Canned peaches, pears, plums. Baked apple, apple sauce. Sponge cake.

Drinks: Milk, buttermilk, cocoa, water, tea, if allowed.

AVOID:

Everything fried or fat.

Everything highly spiced or seasoned. All mustard, vinegar, ketchup, horseradish, relishes, sauces and gravies.

All tinned, smoked and preserved meat and fish.

All pork, veal and game.

All raw fruit.

All stimulants, tea (unless allowed), coffee (unless allowed), and carbonated waters.

All pastries, preserves and candies.

Note.—It is understood that everything not specifically allowed is forbidden.

This diet may be regarded as standard in the sense of being applicable to a great variety of conditions met with in the practice of gastroenterology.

As has been explained in a previous section, no diet list should be handed, as printed, to a patient. It is always time well spent for the doctor and client to go over the list together and make such modifications as appear necessary. In this way only can individual needs and peculiarities be taken into account.

The amount of food consumed depends, of course, on the type of condition present. In well-nourished or obese persons a minimum of three small meals suffices. In the emaciated, or where hunger pains or distress are complained of, full meals or extra nourishment between meals are indicated. It is generally immaterial whether the heavy meal be taken at noon or in the evening unless night distress is present, when, of course, the former alternative should be adopted. In cases where constipation is prominent and

where the stomach can stand it, some of the coarser foods may be added to the diet to increase the bulk of the feces (see Chapters VIII, IX and X). Ordinarily, however, the addition of such articles is not well borne and the object can be better achieved by appropriate medication. When the symptoms are marked and some serious condition is suspected, a more restricted ulcer diet should be instituted (see Chapters V and VI).

The question of how the food is prepared should always receive consideration. For example, fresh mashed potatoes are among the most easily digested foodstuffs, whereas warmed-over potatoes have induced many an attack of indigestion. As a rule, home cooking is far superior to that of the cheaper restaurants. The late Dr. N. B. Potter used to recommend early marriage as a cure for young male dyspeptics.

The use of tea and coffee should be decided from the point of view of their effect on the nerves and bowels rather than on the stomach. Carbonated waters increase cardiospasm and gas distress in some people. The danger in fresh fruit lies particularly in its being insufficiently ripened, and thus increasing greatly the local acidity.

Meals should always be taken on time. A certain amount of latitude as regards the exact hours selected may be left to the patient, but once fixed the meal hour should never be violated. An interval of four hours between breakfast and lunch and six hours between lunch and dinner is generally satisfactory. Extra feeds, when ordered, should also be taken promptly. A very great advantage of regularizing the meals is that the physician is enabled to gain exact knowledge as to the relation of pain to meals and the relief of pain by food. The information thus obtained (and occasionally unavailable from the patient's history) often proves to be of the greatest value in diagnosis.

Too much emphasis cannot be laid on the importance of eating meals with sufficient deliberation. Granted that

normal individuals can bolt their food for long periods of time with apparent complete utilization and freedom from symptoms, there is no question that a dyspeptic individual cannot continue to take such liberties. Eating with sufficient deliberation implies the thorough subdivision of each bolus of food by proper mastication and the cultivation of sufficient leisure for the reasonable enjoyment of each meal. The patient must get as far away as possible from the lunch counter method of feeding. He must be convinced that how he eats is of even greater importance than what he eats. In actual practice it may be found necessary to impose a minimum period for the consumption of each meal (see also page 39).

Drug Therapy.—The medicinal treatment of gastric irritation involves the use of the following three chief classes of drugs: (a) Alkalies; (b) General sedatives; (c) Local sedatives or antispasmodics.

(a) *Alkalies.* Although it has been experimentally established* beyond question that the administration of alkalies is followed after an interval by an increased acidity of the gastric juice, there is no disputing the fact that the symptoms associated with hyperchlorhydria (acidity exceeding 40 degrees free or 60 degrees total after an Ewald test breakfast) are promptly and, as a rule, completely relieved by the proper administration of these drugs. The usage in regard to antacids varies all the way from a single dose of baking powder taken immediately after meals to repeated doses of more or less elaborate combinations of various alkaline salts administered during the digestive period. Sodium bicarbonate, which is probably the most commonly employed alkali, neutralizes acid quickly, but without prolonged action, causes the evolution of considerable gas, and is noncathartic. The property of causing free gas production makes it of value in ridding the stom-

*Crohn, B. B.: Studies in Fractional Estimation of Gastric Contents. II. Effects of Antacid Medication on Gastric Acidity and Secretion. Amer. Jour. Med. Sc., 155: 801-819, 1918.

ach of small but distressing air or gas accumulations sealed in by the spastic action of the cardiac sphincter.

Magnesium oxid (calcined magnesia), on the other hand, neutralizes acid slowly over a long period and is cathartic as well as antacid. Inasmuch as many patients suffer from a triad of "hyperacidity," gas distress and constipation, a combination of both the above drugs is rational therapy and has stood the test of time in the great majority of such cases. A powder of this nature may be prescribed, in bulk, as follows:

℞

Sodium bicarbonate	120.
Calcined magnesia	20.

M. Ft. Pulvis. Sig. Level teaspoonful in a little water after meals.

If too much catharsis is produced by the above, the dose may be reduced, the proportion of magnesia lessened, or an equal part (20 units) of bismuth subcarbonate added. In susceptible individuals too much alkalinization of the system may produce burning on urination. This, of course, calls for a diminution in, or temporary suspension of, the treatment. Where symptoms are not controlled by a teaspoonful dose after meals, as in cases where hunger pains come on late and are severe, the dose may be divided and the second portion administered a short interval before the symptoms become due.

(b) *General sedatives.* It is well to think of every gastrointestinal condition as being composed, possibly, of two elements, one organic, the other functional. The total amount of mischief depends not only on the severity of the organic process, but also on the general nervous (autonomic) instability of the patient. The latter state is exemplified by those common symptoms of widespread character included by the laity under the term *nervousness,* viz., emotional instability, tremors, insomnia, headaches, globus hystericus, "poor circulation," tachycardia, palpitation,

dyspnea, etc. All these things are in addition to the specific functional disorders of digestion already considered. In all patients showing this instable make-up, it is well to eliminate as much of the diffuse symptomatology as possible by the use of general sedatives. By thus depressing the autonomic irritability the "nervous background" tends to disappear and only the really specific symptoms remain. At the same time the patient begins to feel "rested," his confidence and poise tends to come back, and his morale is bolstered.

The drugs best suited to this purpose are the bromids. Fifteen grains of the "triple" salts may be given three times daily. It is best to administer this medication about a half hour before meals in the hope that gastric irritability will be allayed during digestion. A good preparation is the effervescent tablet. If insomnia is prominent a fourth dose may be prescribed at bedtime, or a somnifacient, such as veronal or some of the newer preparations, may be given, or else the bromids may be combined with chloral, as in the following prescription of Dr. Lockwood:*

℞

Chloral hydrat.	2.0
Strontii bromidi	10.0
Aq. chloroformi	120.0
Spir. anisi	0.5

M. Sig. A teaspoonful in water four times a day.

(c) *Local sedatives and antispasmodics.* Atropin has enjoyed an extensive reputation as an antispasmodic par excellence in gastric irritability. In some cases, unfortunately, it seems to produce its toxic effect on the circulatory or general nervous system before it exerts any demonstrable relaxing action on the digestive apparatus. It is well, therefore, to begin with small doses, say $\frac{1}{100}$ of a grain (or 8 minims of the tincture of belladonna) three

*Lockwood, G. R.: Diseases of the Stomach, Philadelphia, Lea & Febiger, 1913, p. 542.

times daily, and then to work up to full physiologic doses of about $\frac{1}{50}$ of a grain (20 to 25 minims of the tincture), or even more, three times daily. Patients with slow pulse seem to stand belladonna much better than those with tachycardia. Many of the other drugs that have been recommended from time to time as digestive tract antispasmodics have the same failing as atropin, i. e., when they work they give good results but their efficacy seems to be capricious. A possible exception among the newer drugs may have to be made in favor of the adrenal preparations, not so much when used by mouth perhaps, as when given hypodermatically, where quick action is required. In certain cases of severe peristaltic unrest and vomiting, particularly in pregnancy, this form of medication may prove to be of considerable value.

Treatment of Special Conditions.—(a) *Hypersecretion.* When the fasting stomach is found to contain considerable amounts (over 25 c.c.) of pure gastric juice, the condition variously named hypersecretion, gastrosuccorrhea, or Reichmann's disease, is said to be present. The treatment of this disorder of secretion is almost specific. It consists of aspirating the fasting stomach each morning. It is surprising how much relief will be afforded by the removal of a small amount of gastric juice under these circumstances. Just why this should be is not readily explicable, but the fact remains that the sensation of weight, distress, goneness, or actual pain complained of by the patient completely disappears just as soon as the offending acid is evacuated.

(b) *Cardiospasm.* Mild forms of cardiospasm are by no means uncommon in gastric irritation. The condition is generally relieved by the alkaline-sedative medication outlined above. It may disappear entirely after the aspiration of a single test meal. In some cases the intubation must be repeated and the tube may be left in situ for a few minutes at each session. Especial emphasis should be laid

on slow and careful eating and all irritating substances should be rigorously excluded from the diet. It may be mentioned that in some individuals the drinking of cold carbonated waters commonly precipitates an attack of this condition.

(c) *Pylorospasm.* Spasm of the pylorus, when not very marked, usually responds to rest, proper diet, and medication. More severe forms of this condition call for the removal of gastric food residues, lavage, and appropriate diminution in, and spacing of, the food intake. The treatment will be considered in greater detail in a subsequent chapter.

CHAPTER V

TREATMENT OF GASTRIC AND DUODENAL ULCER

Prophylaxis—Objects of Active Treatment—Bed Rest—Preliminary Starvation—Rectal Feeding—External Applications—Medicinal Treatment—General Principles of Diet

There is no separate treatment of gastric as opposed to duodenal ulcer. In fact, the treatment of both conditions can hardly be considered very scientific for no less a reason than that the etiology and real nature of the disease are quite unknown at present. It is, therefore, impossible to present either a thoroughgoing prophylaxis or a specific line of therapy. Furthermore, the positive diagnosis of ulcer is often difficult to make and in everyday experience many patients are put on ulcer cures, and quite properly, merely to "take no chances." In such cases, however, the treatment does not even possess the virtue of a therapeutic test because the result still leaves us in doubt as to whether an ulcer was or was not present. Finally, the course and symptoms of ulcer vary within wide limits. It is, therefore, obvious that no single rigid line of treatment should be expected to apply to all cases. In short, the therapy of ulcer is largely a purely empiric procedure.

Prophylaxis.—Despite the fact, as already stated, that a prophylaxis in any real sense is wanting, several points in this connection may well bear emphasis and repetition. The general rules for the prophylaxis of digestive diseases as laid down in the first chapter, if practiced, as suggested, from early childhood, can undoubtedly be relied upon to minimize the incidence of gastric and duodenal ulcer. Furthermore, all actual digestive disorders should always be

Fig. 29.—Duodenal ulcer. Note characteristic deformity of duodenal cap (arrow). In this case there was no 6-hour retention. Observe also marked hyperperistalsis—so-called 5-cycle type.

Fig. 30.—Duodenal ulcer. Note deformity of cap (arrow). Operation revealed dense adhesions from healing of old lesion. Marked pyloric obstruction. Same case as Fig. 34.

investigated and competently treated at the earliest moment. This attention should not be deferred, as often happens because the disability is partial or intermittent, until

Fig. 31.—Gastric ulcer. Note large niche due to penetrating ulcer of lesser curvature (arrow). Confirmed by operation.

repeated recurrences or an unusual duration of symptoms drive the sufferer to seek professional attention. In this connection it is well to remember that any lesion of the

digestive tract other than ulcer, such as appendicitis, gall bladder disease, chronic constipation and the associated cathartic habit, may by some reflex spastic, hypersecretory, or ischemic mechanism favor the development of gastro-duodenal ulceration. The theory that bacterial infection plays a primary rôle in ulcer formation, though again lately urged in some quarters, cannot be accepted as proven. Of course, the removal of infected foci anywhere in the body, inasmuch as these might serve to impair the general health of the individual, would naturally be expected to diminish the chance of ulcer formation, should a tendency in that direction be present. There is no question whatever that a tendency to the production of ulcer presents a very real diathesis in certain individuals and even in whole families. Such subjects should not only exert special care in their personal prophylaxis, but should always keep themselves under medical observation, so as to avoid as much as possible the recurrence of disabling symptoms.

The condition of the teeth is of considerable practical importance outside of any theoretical consideration of the dangers of "focal" infection. Pyorrhea, dental caries, and missing teeth mean a deficient mechanical subdivision of food in the mouth and thus impose an unfair extra burden on the stomach and the rest of the digestive apparatus. Serious as such a disability is in the "pre-ulcer" stage, it becomes, if anything, still more of a handicap during the course of active treatment, when every conceivable effort is made to spare the stomach and duodenum.

The question of body habitus, too, should receive attention. Those individuals who enjoy a sthenic build and the accompanying ability to eat almost any food at any time and in any quantity that may suit their fancy, may find that even their capacity can be strained or exceeded. Such persons should be cautioned earnestly against committing excesses in eating, drinking and smoking, and should be taught to recognize the first signs of discomfort as a strict

warning to return to the rules of regular living and moderation. The details of treatment applicable in such cases have already been outlined in the chapter on the treatment of "gastric irritation." Not only should the diet be bland and unstimulating, but the total bulk should be reduced in considerable proportion.

Asthenics, on the other hand, by virtue of their malnutrition, their general irritability, their occasional anemia and their rather frequent vagotonia, are also likely to develop ulceration. The preventative measures applicable to these subjects have already been considered in detail in the chapter dealing with the treatment of ptosis and the asthenic state. Such measures include particularly general bodily rest, careful feeding with concentrated nutritious diet, and support of the lower abdomen.

Active Treatment.—*General Considerations.* The objects of active treatment are first to promote in every way possible the conditions favorable to healing of the ulcer, and secondly to overcome the disturbed physiology caused by the disease and thus to control the symptoms complained of by the patient. The various empiric measures that have been devised to carry out these plans vary considerably in the principles made use of. For example, some authorities favor a preliminary period of starvation, whereas, others recommend feeding from the beginning. Likewise, the diet, according to some, should be predominately carbohydrate in character, while others insist on foods rich in proteins. Still another plan of treatment calls for the complete shortcircuiting of gastric and upper duodenal digestion by feeding through a tube opening deep in the duodenum. In some cases, also, ambulatory treatment may be the plan decided upon. Finally, in those cases failing to respond to medical care, the question of surgical relief must be considered.

At first blush, perhaps, the therapeutic field may indeed look a bit confusing. Once the underlying principles of

treatment are understood, however, the choice of methods is rendered much simpler. In a disease that shows such a wide variation in course and symptomatology as that under discussion, it is obvious that no single method of therapy can be expected to be equally serviceable in all cases. Some patients will do better on one plan of treatment than on another. It is, therefore, not a competition between methods, but a selection of the best available method for the particular case that is the problem that confronts the physician. Here, as elsewhere, then, the individualization of cases is the keynote of good therapy.

Bed Rest.—The first object of ulcer therapy, namely, the institution of conditions that favor healing of the lesion, can naturally be best accomplished by putting the affected part at rest. Inasmuch as both bodily and mental activity are believed to stimulate gastric peristalsis, it is customary to order the patient to give up all work and undergo a bed rest cure. There is no question that bed rest is strictly indicated after hemorrhage wherever the symptoms are at all alarming, and wherever the trouble has persisted or recurred, despite less thoroughgoing treatment. In all other cases it is, to say the least, the method of choice and should always be offered as such to the patient. There are some individuals, however, who, for various reasons, either cannot or will not go to bed. This is particularly often true in the case of clinic patients who are the family bread winners and to whom a period of nonemployment from any cause represents such a tragic sentence that they are willing to accept almost any risk in order to escape it. Other patients there are who, though they suffer indeed from ulcer, present such mild and easily controlled symptoms that bed rest appears to them an unnecessary hardship. In both these cases ambulatory treatment may be attempted and the results of clinic experience occasionally justify its employment. The details of this form of treatment will be presented in a subsequent section.

Preliminary Starvation.—Assuming then that the patient is to undergo a bed rest cure, the question that next demands an answer is—Shall the treatment be initiated by a period of preliminary starvation? There can be no doubt that hemorrhage (hematemesis) is an indication for at least a short period of food abstinence. In well-nourished, sthenic individuals, also, a preliminary starvation is not only well borne, but may be highly beneficial. In the asthenic and chronically undernourished, however, a deprivation of sustenance is not so clearly indicated and may indeed prolong the period of recuperation.

The object of food deprivation is to aid the healing process in a twofold manner. In the first place the activities of the stomach, both secretory and motor, are reduced to a minimum. In the second place, the stomach, being empty, is allowed to contract down to its smallest possible dimensions. The period during which starvation is continued extends from two or three days to a week or more, depending on the time required for the disappearance of symptoms and on the general condition of the patient.

During the period of food abstinence the care of the mouth is of the greatest importance. The objects secured by proper attention in this direction include the prevention of bad taste, coated tongue, and possible parotid infection; and the control of thirst as well. A very worth-while practice is to have the patient chew paraffin wax at stated intervals throughout the day. The wax should be of the proper consistency. The commercial "Parowax" has been found quite satisfactory. The use of mouth washes and of the toothbrush should not be neglected. Small pieces of cracked ice may be sucked from time to time where thirst is a prominent symptom.

Rectal Feeding.—If the period of fasting is at all prolonged, or the patient is exsanguinated or much undernourished, the introduction of fluids by rectum is indicated. By far the simplest and best way is the use of the Murphy

drip. This can supply fluid at the rate of one-half pint an hour (one drop per second) or even faster. Plain saline solution or decinormal sodium bicarbonate or ten to twenty per cent glucose may be given in this manner. The last two solutions tend to overcome acidosis; the glucose adds nutriment as well. The fluid may be introduced as in post-operative cases, "two hours on and two hours off" during the day.

The old method of trying to maintain nutrition by the introduction of ordinary foodstuffs per rectum by means of "nutritive enemata" has been shown to be fallacious. Only amino-acids, simple sugars, and alcohol can be absorbed from the lower intestine. If it is deemed necessary to supply nourishment in this manner, thoroughly pancreatinized (not peptonized) milk should be used for this purpose. The milk should first be skimmed because the fat is not absorbed and may cause irritation; the pancreatinization reduces the proteins to amino-acids; the sugars and salts are unchanged. Or else the clysma suggested by Smithies* may be employed:

℞

Alcohol 50%	30.0
Glucose	30.0
Normal salt solution q. s. ad	240.0

Nutritive enemas should be administered at body temperature by the drop method with the patient on his back and the hips elevated. A bulk of ten ounces (300 c.c.) should not be exceeded. A little opium (ten minims of the tincture) may be added to the first few feedings in case irritation is present. The rectal tip need not be inserted further than just beyond the anal sphincter. The enema may be given twice daily.

External Applications.—The use of external applications to the abdomen is common to practically all methods of

*Smithies, F.: A Treatment of Gastric Ulcer Based Upon Established Clinical, Histopathological and Physiological Facts, Amer. Jour. Med. Sc., 153:556, 1917.

treatment. Except in the case of hemorrhage, where cold is universally recommended (see section on treatment of hemorrhage), hot moist applications are made with the idea of promoting healing of the ulcer, preventing painful spasms of the stomach, and restoring normal gastric function in general. The distress and atypical pains due to gastric adhesions are also relieved by this procedure.

Perhaps the best latter-day method of securing the benefit of heat is by means of the electric pad. A piece of moist flannel insulated by rubber tissue, should be placed under the pad and the whole covered by an abdominal binder. The temperature should be maintained at a point as high as it can be borne and the flannel is to be changed whenever it becomes dry. If an electric pad is not available the original procedure, as recommended by v. Leube, may be resorted to, i. e., compresses wrung out of water as hot as it can be borne are applied and renewed at frequent intervals, every half hour, or even every fifteen minutes.

A less efficacious though far less troublesome method than that just mentioned is the Priessnitz compress. This consists of a piece of flannel wrung out of warm water and covered by a large towel. Over all goes the abdominal binder. This application is changed from two to four times by day and once during the night.

Smithies recommends constant applications of Ochsner's solution (alcohol-boracic acid) as an aid in overcoming gastric spasms.

Medicinal Treatment.—Medicines do not play much of a rôle in ulcer therapy. The chief reliance is placed on careful feeding according to one or other of the dietary regimens about to be described. The old faith in the specific healing action of such drugs as silver nitrate, or in the efficacy of the protecting coating of the salts of bismuth has been considerably shaken.

Of medicinal measures those which tend to control gastric acidity are nowadays in greatest favor. The use of

alkalies is very widespread. And this, despite such apparently sound theoretical objections to their routine administration as that in many cases neither hyperacidity nor hypersecretion is present, and that it is possible that alkalinizing the stomach may delay or prevent healing of the ulcer. Amongst the many antacids, Carlsbad salts have enjoyed a long reputation. If the natural water is unavailable the artificial salts (sodium sulphate 50; sodium bicarbonate 6; sodium chloride 3) may be substituted. The dose is a teaspoonful in 8 ounces (a large tumblerful) of hot or warm water. The salts are usually taken on a fasting stomach. Where constipation is marked the dose may be increased or repeated.

An alkaline water, such as Celestins Vichy, is also commonly prescribed. It may be given alternately with, and in amounts equal to, the feedings from the beginning of treatment.

The Bourget method* of using alkalies is also in favor. It consists of sipping a dilute solution of salts during a period of one-half to two hours after meals, depending on the amount of food taken. The original formula is:

℞

Sodium bicarbonate	8.0
Sodium phosphate	4.0
Sodium sulphate	2.0

M. and ft. pulvis. D.T.D. no.X

Sig. Dissolve one powder in a liter of cold water.

Satisfactory results may be obtained from the use of the alkaline powder recommended for the control of "gastric irritation" (hyperacidity), composed of six parts of sodium bicarbonate and one part of heavy calcined magnesia. From one-quarter to one-half a teaspoonful or more may be given in one dose or in divided doses after each feeding.

*Bourget, L.: Les Maladies de l'Estomac et leur Traitement, Paris, Baillière et Fils, 1907, p. 133.

The administration of alkalies also forms an integral part of the Sippy treatment about to be described.

Where vagotonic symptoms form a prominent part of the clinical picture the exhibition of atropin or belladonna may be of value. As mentioned in a previous section, it is always a good plan to increase the dose of this drug gradually to physiological limits. For general restlessness or insomnia the bromids, codein, or the somnifacients may be administered. In the treatment of simple ulcer morphin is not indicated.

Diet: General Principles.—The mainstay in ulcer therapy is the dietetic management. Different plans of feeding have been elaborated by different workers. However, all methods in which feeding is carried on by mouth(duodenal alimentation will receive special consideration) possess certain general principles in common. Perhaps first and foremost is the principle of feeding only small quantities at a time. In this way are continued, though necessarily less thoroughly, the benefits derived from complete food abstinence; i. e., each individual gastric cycle is reduced to the smallest possible effort, and the stomach is kept in a state of relative contraction.

The second principle in feeding is the maintenance of the state of nutrition. Every effort is made to reduce the danger of malnutrition to a minimum. During the first week or so the loss of a few pounds is inevitable, since the total amount of food given is insufficient to maintain body weight. From the second week on, however, a drive is begun to reach the patient's normal weight (should he be undernourished) and, as Lockwood has put it, it then becomes a question of great nicety how far the diet can be carried without detriment to the patient's ultimate chances of recovery.

The third basic principle of every feeding plan is that the diet be bland, nonirritating and nonstimulating. It is here, however, that we meet with considerable difference of

opinion as to just how this should be carried out. Indeed, it may be said that two, almost diametrically opposed, schools of procedure have arisen. According to one plan, originated by v. Leube, the best foods for the end in view are the carbohydrates, preferably in liquid form, the idea being that these require the minimum gastric digestion and likewise impose the minimum of work upon the duodenum. The other plan of treatment was devised by Lenhartz (and forms a basic part of the present popular Sippy diet). According to this plan, a concentrated protein food, such as milk, is fed at frequent intervals for the reason that it combines quickly and thoroughly with the hydrochloric acid and prevents the corrosion which is considered to be largely responsible for the continuance of ulceration. In the following pages, for the sake of simplicity, these two diets will be called, respectively, the "Carbohydrate Diet" and the "Protein Diet."

Finally, it should be remembered that the feeding of human beings, and particularly of those with ulcerated stomachs, is always a task in which a good deal of individualization is necessary. A distinct preference for, or objection to, a certain kind of food, when strongly *expressed by the patient* should not be arbitrarily overruled but should be accepted as a guide to treatment of just as much importance as any purely theoretical concept of feeding. Thus, so long as the therapy is carried out systematically, according to the basic plan of small meals at frequent intervals, it may, in such cases, prove the part of wisdom to leave it to the patient whether milk or carbohydrates or both interchangeably, shall be used for his nourishment. By this means not only is the increased assimilation that goes with the eating of desired foodstuffs made use of, but the cooperation of the patient is furthered, and the tedium of a long convalescence is reduced instead of being accentuated.

CHAPTER VI

TREATMENT OF GASTRIC AND DUODENAL ULCER (Continued)

THE "CARBOHYDRATE DIET"—THE "PROTEIN DIET"—CONVALESCENT ULCER DIET—THE SIPPY DIET—DUODENAL FEEDING—AMBULATORY TREATMENT—HEMORRHAGE—PYLORIC OBSTRUCTION—PERFORATION—SURGICAL TREATMENT OF ULCER

The "Carbohydrate Diet."—This plan of feeding is very frequently associated with a preliminary period of starvation. The conditions determining the duration of food abstinence have already been stated. When feeding is resumed it is very gradual and sparing. Among the foodstuffs selected (Smithies) are the liquid carbohydrate preparations, such as barley water, rice gruel, thin Cream of Wheat, thin (creamed) vegetable soup, etc. Some of the simpler foods are prepared as follows:

Barley Water. Barley, one teaspoonful; water, one pint. Mix barley with one ounce of water into a smooth paste free from lumps. Pour into a sauce pan containing one pint of boiling water. Stir constantly over the fire for 20 minutes while boiling. Strain through gauze.

Oatmeal Gruel. Oatmeal, two heaping tablespoonfuls; water one quart. Boil down to one pint. Strain through gauze. Pinch of salt to taste.

Rice Water. Rice, two tablespoonfuls; water, one quart; milk sugar, one ounce. Cook in double boiler for 1½ hours. Strain and add boiling water to make up one quart.

Arrowroot Gruel. Arrowroot flour, one teaspoonful; water, one pint; milk sugar, five teaspoonfuls. Cook for 20 minutes. Strain.

From four to six ounces of such warm liquids are given

every hour during the day. By the second week small amounts of boiled milk, soft eggs, rice, and even boiled chicken (minced) are added to the diet. As the amount of food is increased, the intervals between feedings are naturally lengthened. By the third or fourth week soft white bread, finely minced steak, potatoes, purées, macaroni, and weak tea or coffee may be given. After the fifth week a gradual return is made through the *convalescent ulcer diet* about to be described to the *standard bland diet* already given in the chapter on the treatment of "gastric irritation." This diet, which is liberal enough in its choice to satisfy any reasonable craving, should then be continued for the remainder of the patient's life.

The indications for a carbohydrate diet may be summarized as follows:

1. The patient is robust and well nourished.
2. The gastric acidity is not high (?).
3. The patient prefers the diet to that of milk and eggs.

The "Protein Diet."—In this plan of feeding highly albuminous food is given in steadily increasing amounts from the first day of treatment, there being no preliminary period of starvation even after hemorrhage. This diet is generally preferred in patients weakened by bleeding, by long-standing malnutrition, or by prolonged vomiting.

The classic example of this diet is the form advocated by Lenhartz. This consists of a detailed program of feeding for a period of 14 days, during which absolute rest in bed is insisted upon. The basic material is milk and eggs, to which other foodstuffs are gradually added, the amount of each being steadily increased from day to day. The milk and eggs, together with all the utensils used in the first few days' feeds are kept ice cold. During the first ten days the diet is very strictly followed, one-twelfth of the total daily feeding being administered every hour during the day. The first day two eggs and 100 c.c. (3 oz.) of milk are allowed. The eggs are then increased one per day until the

eighth day and the milk 100 c.c. per day until the tenth day, eight eggs and 1000 c.c. (one quart) of milk representing the maximum daily amount of these substances. On the third day sugar is added, on the sixth scraped beef, and on the seventh rice. During the second week zwieback, butter and chicken are given. After the tenth day the interval of feeding is increased to two hours.

The great difficulty with the Lenhartz diet is what might be expected from any such cut and dried, prearranged plan of feeding. Too many eggs, too early allowance of meat, are some of the most common complaints against it. In short, as a guide to the physician, the plan serves a useful enough purpose; as a rigid rule of procedure for each individual patient it is doomed to a very restricted field unless it undergoes appropriate modification. In actual practice, therefore, the "protein diet" is nowadays a much more loosely outlined plan of feeding based on milk as the chief article of diet. The prominent position held by milk is due not only to its high nutritive qualities, but to the simplicity of its utilization (minimum preparation) and its universal availability. The latter feature is still further increased by the recent advent of excellent milk powders, which (as for example in the case of the commercial "Klim") furnish perfectly satisfactory milk by simple admixture with water.

In many patients it is impossible to begin feeding with so rich a combination as milk and eggs. Recent hemorrhage, anorexia, nausea, prostration, hour-glass contraction may indeed demand rapid building up, but the beginning must be made with the very simplest elements of diet. In such cases feeding may be begun with plain milk, one-half to one ounce every hour or every two hours during the day. If even this proves too much the milk may be peptonized. This is readily accomplished by Lockwood's method:*

To one pint of milk is added ¼ pint of water, and the

*Lockwood, G. R.: Diseases of the Stomach, Philadelphia, Lea & Febiger, 1913, p. 183.

mixture is then divided into two equal parts. Boil one part, and immediately afterward add the other. Stir in the contents of one of Fairchild's peptonizing tubes, and set the bottle in warm water for one and one-quarter hours. Bring rapidly to a boil and keep on ice. The completely peptonized milk should have a slightly bitter but not unpleasant taste.

As progress is made, the dose given at each feed is increased and the interval between meals is lengthened, so that at the end of the first week in favorable cases the invalid is taking 6 to 8 ounces at a time every three hours. Every effort should be made to feed as much as possible and yet to avoid at all costs nausea, vomiting, and increased distress.

In patients who take their food well, on the other hand, the caloric value of the diet can be greatly increased from the beginning, as Held and Gross* have pointed out, by the addition of sweet cream to some, if not to all, of the feedings. Ice cream, too, has been recommended (Da Costa)† as an ulcer diet, and when properly prepared it should make an ideal food for the purpose. It is important that no corn starch or other thickening be used in the mixture, and that the amount of sweetening be greatly reduced from the proportions ordinarily included.

In these more robust individuals fairly rapid progress can be made. During the second week the diet is enlarged by the addition of well cooked and strained cereals, soft boiled eggs, butter, toast and Uneeda Biscuits soaked in milk. If there is an aversion to warm butter, fairly large amounts may be well borne if the butter is first thoroughly frozen in the ice-box and then chopped into small pieces which are allowed to melt in the mouth. At the beginning of the third week scraped or minced lamb or chicken or

*Held, I. W., and Gross, M. H.: A Modern Aspect of the Treatment of Ulcus Ventriculi, Amer. Jour. Med. Sc., 157:8-33, 1919.

†Da Costa, J. C.: Medical News, Aug. 8, 1891. Quoted by Manges, in his translation of Ewald's "Diseases of the Stomach," New York, D. Appleton & Co., 1897, p. 437.

small pieces of boiled fish may be given; also thoroughly mashed vegetables, such as potatoes, peas, asparagus tips or cauliflower. A safe rule to follow is that only one new article be given at a time. It is during the third week that milk is discarded as the chief article of diet. It may thenceforth be given between the heavier meals representing the ultimate breakfast, dinner and supper.

During the third or fourth week, depending on his strength and general condition, the patient is allowed out of bed, but should rest consistently after the three chief meals of the day. He may now be put on a convalescent ulcer diet as follows:

Convalescent Ulcer Diet

(Vanderbilt Clinic Diet Lists)

Breakfast:

Boiled milk with cocoa or coffee.
Any cooked cereal, strained, with cream.
Dry toast, buttered.
One egg, soft boiled or poached.

Ten A.M.

Glass of milk, or malted milk, or milk with beaten egg, or any fermented milk.

Lunch:

Thick potato, pea, or bean soup with toast soaked in it; or boiled rice with milk or cream.
Two soft boiled, scrambled or poached eggs.

Four P.M.

Bouillon with rice, or chicken broth and toast or dry crackers.

Supper:

Minced chicken or rare scraped beef, or inside of chop or fish.
Mashed or well baked potatoes.
Buttered toast.
Junket or custard, Jell-O, or rice or tapioca pudding.

Ten P.M.

As at ten A.M.

General Directions:

1. Take your meals precisely on time.
2. Chew your food extremely carefully.
3. Eat and drink very slowly.
4. In preparing food, use no spices and as little salt as possible.
5. Eat and drink nothing besides articles given on this list, except water.

The Sippy Diet.—This is a specific method of feeding devised for the prevention of acid corrosion by the absolute control of free hydrochloric acidity. The patient is put to bed for approximately three weeks. He may then be allowed to sit up a portion of the day and take short walks. In the absence of serious complications the patient is able to do some or all of his work at the end of four or five weeks. There is no period of preliminary starvation. An ordinary citrate of magnesia bottle filled with equal parts of milk and cream and kept in a pitcher of ice water at the bedside, with the powders, a measuring glass and a timepiece constitute the paraphernalia of treatment. Three ounces of the milk and cream mixture are given every hour from seven A. M. to seven P. M. After a few days a soft egg with cracker or bread and butter may be added to one of the forenoon feedings, and three ounces of a cereal, such as well cooked rice, oatmeal or farina, may be added to one of the afternoon feedings. The cereal is measured after it is prepared. Eggs and cereal are gradually added until at the end of the first week the patient is usually taking each day three ounces of the milk and cream mixture every hour, and in addition, two or three soft eggs, one at a time, and 6 to 9 ounces of a cereal, 3 ounces at a feeding. The cereal and eggs are given at alternate feedings. From this point on custards, cream soups, vegetable purées and other soft foods may be substituted now and then for the milk and cream feeds.

In simple cases of ulcer, i. e., those uncomplicated by food stagnation or excess secretion, the free acidity is usually controlled by feeding every hour, as described, and by giving midway between feedings a powder containing 10 grains each of heavy calcined magnesia and sodium bicarbonate, alternating with a powder containing 10 grains of calcium carbonate and 30 grains of sodium bicarbonate. In addition, the powders should be given every half hour after the last feeding for four or five doses, or until the

stomach contains no food, as determined by the occasional use of the stomach tube. If diarrhea develops the calcium carbonate and soda powders should be substituted for the magnesia and soda powders a sufficient number of times during the day to control this troublesome symptom. Routine aspirations to determine whether free HCl is controlled should be performed at least on two afternoons and three evenings of each week while the patient is under accurate observation. The evening aspiration should be made one-half hour after the last powder is taken, i. e., at about 9:30 P. M.

At the beginning of the fourth week the patient is placed under practically the same management as is to be followed during the remainder of his treatment. The routine is now changed to three small meals daily (breakfast, dinner and supper), with milk and cream at hourly intervals, alternating with the powders. The total bulk of food allowed at any one meal should not exceed 10 or 15 ounces (measured after being prepared). After the fourth week a small amount of meat may be taken. Potatoes, cooked fruits (later raw fruit) and ordinary desserts may be added to the diet. It is found that patients can continue this treatment, with occasional intermissions, while at home or at work even for months after the ulcer is healed. Sippy* recommends that the "accurate management," as outlined, be continued for at least one year.

Duodenal Feeding.—By means of the duodenal tube nourishment can be introduced deep into the duodenum well beyond the usual site of gastric or duodenal ulceration. In this way the diseased parts are entirely spared the task of food digestion and even of food reception. Unfortunately many persons are unable to accommodate themselves to the constant presence of a tube in the mouth and pharynx, and in susceptible subjects, throat irritations or tonsillitis may develop. The method is thus limited in its

*Sippy, B. W.: Ulcer of the Stomach, in Nelson Loose-Leaf Medicine, New York, 1920, Vol. 5, 260 ff.

applicability to those who are or who can be readily tube-broken. Another perhaps more theoretical disadvantage is that the tube itself may act as a gastroduodenal irritant and cause an increase in peristalsis despite the exclusion of food from these parts.

The tube is introduced simply by having the patient swallow the bucket or tip. The act of deglutition is much more easily performed when the head is held forward than when it is thrown back. Of the many types of tips on the market, that of Jutte, being the smallest, is the easiest to swallow. The wire stylet may be employed to aid the introduction, though this is not often necessary. After the tip passes into the esophagus the tube is rapidly swallowed (with the aid of a little water, if desired) for a distance of about 50 cm., which corresponds to the first mark on the tube as usually supplied by manufacturers. This brings the tip well within the stomach. The patient then lies down on his right side, thus assisting by gravity the penetration of the pylorus, and very gradually swallows 10 or 20 cm. more of tubing. From now on tests should be made to determine the exact position of the tip of the tube. The surest means of establishing this is, of course, direct fluoroscopic observation. With a good roentgen apparatus both tip and tube can be made out without the addition of contrast substance. Where no fluoroscope is available the tests already enumerated in the first chapter (see page 32) should be employed to decide whether the tip is in or out of the stomach. After the pylorus is penetrated the tube should be swallowed for another few centimeters until a total of 75 cm. or more is introduced. This distance generally brings the tip well within the second or third portion of the duodenum. Not until this position is definitely established should feeding be commenced.

At this point a word may be in order as to the time required for the penetration of the pylorus. In the first place it must be recognized that where pyloric obstruction exists,

or even a high grade of pyloric spasm, the tip may never succeed in passing into the duodenum. However, even where there is no such interference at the pylorus the time of passage varies within the widest limits. In some individuals the tube may go through within ten or fifteen minutes. In others, or in the same individuals at other times,

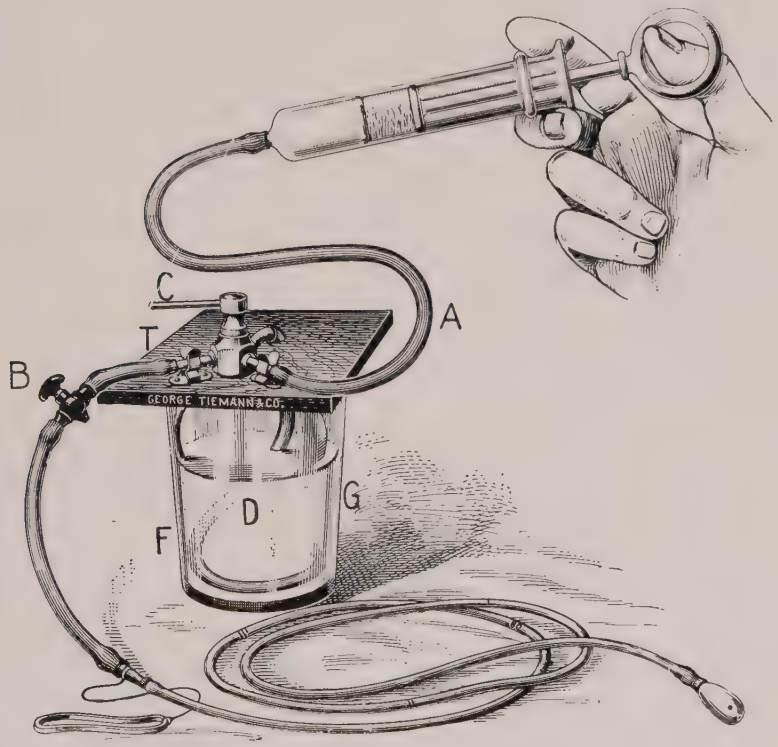

Fig. 32.—Duodenal feeding apparatus.

the tube may not go through for many hours. It may even be necessary to leave the tube in overnight before success is achieved in such cases.

The plan of duodenal feeding recommended by Einhorn* calls for a meal of 7 ounces (one glass) of milk, one raw egg, one tablespoonful of sugar, given every two hours dur-

*Einhorn, M.: Diseases of the Stomach, 6th Ed., New York, Wm. Wood & Co., 1920, p. 266 ff.

ing the day from 7 A. M. to 9 P. M. The mixture should be well beaten, strained, and administered slowly at body temperature. It may be injected with an ordinary glass (Luer) syringe, or allowed to flow in from a constant temperature reservoir such as that recently devised by Buckstein.* After each feeding the tube should be thoroughly cleared by injecting about 10 c.c. of water, followed by a syringeful of air. The petcock at the mouth end of the tube should then be closed to prevent regurgitation. These details should never be neglected, as a milk curd may form within the tube and completely obstruct it. Tube feeding may be continued in this manner for two or three weeks to such advantage that the patient may show a gain in weight at the end of this period.

Ambulatory Treatment.—It has already been shown that in certain types of cases ambulatory treatment may be justifiable. The best results are undoubtedly secured in robust individuals whose symptoms are relatively mild—being those previously described as characteristic of gastric irritation—and which practically disappear as soon as the diet is regulated.

For the first two weeks of treatment such individuals should restrict their daily activities to the minimum. They should lie down after meals and should retire early, say at 8 or 9 P. M. Feeding should be begun with a pint of milk and two eggs four times a day: at 8 A. M., 12 noon, 4 and 8 P. M. As the caloric value of this diet (generally less than 2000 C. per day) is insufficient to maintain body weight in an up-patient, it should be supplemented after a day or two by the addition of cream and lactose to the above feedings. As soon as possible the six meals a day plan should be adopted as already outlined under the convalescent ulcer diet. The diet may then be gradually changed to the standard bland diet, as in the plans of feeding previously outlined. Medication such as that described

*Buckstein, J.: A Container for the Administration of Fluids, Jour. Amer. Med. Assoc., 75:1342-1343, 1920.

for the treatment of gastric irritation is generally satisfactory for the control of such symptoms as do not yield to the dietetic treatment alone.

Treatment of Special Conditions and Complications.—(a) *Hemorrhage.* Hemorrhage in ulcer may be evidenced by vomiting of blood (hematemesis) or by the passage of dark stools (melena). Immediate and absolute bed rest is the first essential in treatment. An ice bag, or better still, an "ice coil" should be applied to the abdomen with the double purpose of contracting the bleeding vessel by the application of cold and of keeping the patient quiet by virtue of his subconscious fear of displacing the apparatus. The tendency to syncope may be overcome by raising the foot of the bed. Apprehension and restlessness are best controlled by an injection of morphin. In order not to provoke or increase nausea or vomiting all food should be withheld for 12 to 24 hours, or as much longer as may be necessary. Where a prolonged fast seems indicated, fluids may be given per rectum, as already described. To allay thirst the patient may be allowed to suck small pieces of ice from time to time.

Fortunately, in the majority of cases the actual hemorrhage stops spontaneously within a few hours. If the bleeding should persist despite the above-mentioned efforts to check it, gastric lavage with ice water should be practiced. The object of this maneuver is to empty the stomach of blood clots, so that it can contract down on the bleeding point in the same way that the distended uterus contracts down after the expulsion of the placenta. If lavage also is unsuccessful, preparations should be made for immediate blood transfusion. Nowadays this may be readily accomplished and should never be delayed too long.

Operative interference has little to offer in the way of controlling gastric or duodenal hemorrhage. If, for any reason, operation should be decided upon, it should always be preceded by transfusion.

In the case of marked bleeding into the intestine, uncomfortable distention and constipation not infrequently follow the early dark stools and the opiate injection. In such cases an enema is generally followed by prompt relief of the discomfort.

(b) *Pyloric obstruction.* When the condition of pyloric obstruction, or better, delayed gastric emptying, complicates an active gastric or duodenal ulcer, it is due either (1) to inflammatory swelling of the tissues about an ulcer located at or near the pylorus, or (2) to a spasm of this part of the stomach, or (3) less commonly to a localized peritonitis. This condition is to be distinguished from a chronic pyloric obstruction due to organic narrowing of the pyloric ring by scar tissue resulting from the *healing* of an ulcer at or near the pylorus.

The principles underlying the treatment of an active obstructing ulcer (the type first mentioned) have been set forth by Sippy as follows:

1. The ulcer itself is to be treated by the plan of "accurate management" already outlined (see "Sippy Diet").

2. Since acid corrosion is greatly increased, owing to the prolonged retention of irritating gastric contents, an increased amount of alkali is required for its control.

3. Excessive night secretion, being the rule, should be controlled by regular and repeated aspirations of the stomach after the last feeding of the day.

4. The emptying time of the stomach should be repeatedly determined by the employment of motor meals.

The details of the treatment are of importance. The amount of alkali is increased in the powders given between feedings and after the last meal of the day. The aspiration at 9:30 P. M. of the first day should be followed by an 11:30 or midnight aspiration. If 100 c.c. or more of strongly acid gastric juice are found, a continued secretion exists. A powder should be given the next evening immediately after

the 9:30 aspiration, and every half hour thereafter until the stomach is again aspirated at 11:30 or midnight.

In many cases, after a week of this treatment the stomach will be found to contain no more than 15 or 20 c.c. of secretion. This quantity being normal, no further late aspirations are required. From this point on the stomach should be evacuated every night one-half hour after the last powder is given, i. e., at 9:30 P. M. If no free acid is present at that aspiration and no food remains, the free acidity and emptying time may be assumed to be controlled during the entire day.

In those cases where the pyloric obstruction is more marked, it may be necessary to continue the powders after the 9:30 aspiration and to aspirate at 11:30 for two or three weeks before success is achieved. About two weeks after the beginning of this plan of management an ordinary Leube (7 hour) motor meal (see next chapter) may be given in order to determine how much has been accomplished in the way of improving the stomach emptying time. The amount of residue recovered at the end of the seven hours is compared with the amount similarly obtained prior to treatment.

According to Sippy, approximately 85% of all cases of pyloric obstruction due to ulcer disappear within the first three weeks under the management advocated above. If the stomach does not completely empty itself within normal limits after three weeks of such treatment, the obstruction is due to the formation of a cicatrix which can generally be relieved only by gastroenterostomy. The possibility of cancer being present should also be borne in mind, because it is in just these circumstances that early surgical intervention gives practically the only chances of cure. The persistence of blood in the stools for a period exceeding two weeks of careful feeding should always arouse the suspicion of malignancy. In such cases an x-ray examina-

tion repeated at intervals, if necessary, may help decide the nature of the obstruction.

(c) *Perforation.* The possibility of gastric or duodenal perforation should never be lost sight of, as prompt action may be necessary in order to avoid disaster. Where the rupture is small ("pinpoint") it may close off quickly or become well localized and take care of itself without surgical intervention. In such cases patients have recovered under medical treatment consisting of the administration of an opiate, absolute bed rest with cold applications to the abdomen, and the withdrawal of mouth feeding for at least two or three days. When perforation is suspected the patient should be put at once under the most scrupulous observation with special reference to the spread of abdominal tenderness, rigidity and distention, changes in the rate and character of the pulse, and the development of shock. In every case a surgeon should be brought into consultation at the earliest possible moment after the condition is suspected.

Surgical Treatment of Ulcer.—There can be no question that in certain complications of ulcer, such as organic pyloric obstruction and perforation, surgical treatment is strictly indicated. Where such complications do not exist, however, the indications for operative intervention are by no means so clear. In this connection it must be borne in mind that every surgical procedure carries, in addition to its immediate operative mortality (which differs greatly according to the individual surgeon), the danger of developing some malfunction or disability from the operation itself (adhesions, malfunction of gastroenterostomy, gastrojejunal ulcer, etc.). To be sure, cures have been reported from each of the various interventions advocated—gastroenterostomy, excision of the ulcer-bearing area, and even gastrectomy—but it is doubtful whether the results obtained have been, on the whole, any more satisfactory than those following any of the methods of conservative

medical treatment when thoroughly and conscientiously carried out.

On the whole, therefore, it seems best to prefer medical treatment as a routine procedure, and to resort to surgery only in the presence of such complications as those mentioned above or in atypical or unusually rebellious cases.

CHAPTER VII

TREATMENT OF DELAYED GASTRIC EMPTYING

General Considerations—Causes—Principles of Treatment—Motor Meals—Lavage—Feeding—Gastroenterostomy—Postoperative Care— Transient vs. Permanent Gastric Retentions—Special Conditions

General Considerations.—Approximately one in every six to eight patients with digestive complaints suffers from some degree of delayed gastric emptying. This condition is quite like the syndrome of gastric irritation in that it may be produced by one or more of a great variety of disorders originating either within the stomach or elsewhere in the body. Before taking up in detail the treatment of delayed gastric emptying, it may be well to review briefly its various causes, and to precede this, in turn, by a short consideration of the several factors that determine gastric emptying in general. These latter are:

1. *The shape of the stomach.* This, of course, varies with the habitus of the individual. The stomach of the asthenic empties much more slowly than that of the sthenic even in conditions of apparent health. In severe cases of asthenia the accompanying marked ptosis and atony may cause a considerable delay in emptying.

2. *The character of the motor meal.* The time required to evacuate a small meal is obviously less than that required for a large meal. Similarly, carbohydrates leave the stomach sooner than proteins or fats, and fluids sooner than solids.

3. *The tone of the stomach wall.* Atony is one of the most important causes of delayed emptying. The condition may be primary as in asthenia universalis, already mentioned, or secondary as in pyloric obstruction. Ptosis

is often associated with atony, but ptosis alone is insufficient to produce delay of any clinical significance.

4. *The degree of acidity of the gastric juice.* The greater the acidity, the slower the emptying. Thus, in hyperacidity the pylorus tends to become spastically contracted and delayed emptying occurs; whereas, at the other extreme, achylia gastrica is associated with pyloric insufficiency and gastric "hypermotility."

5. *Nervous influences.* The nervous system may influence the emptying of the stomach in two possible ways. The first, and perhaps the most important, is by the closure of the pyloric sphincter in response to some irritant. In many, though by no means all cases, the expression of this irritant seems to be an increased acidity of the gastric juice. Clinically, spasm may arise directly from causes within the stomach, such as ulcer, or reflexly from causes without the stomach, as in diseases of the gall bladder. Roentgenoscopically, pylorospasm is often associated with hyperperistalsis.

Another type of nervous disturbance connected with retarded propulsion is that which occurs in fatigue, intoxications, and intense emotional states. This is to be distinguished from the first type in that the cause is general or systemic and the pathological condition is probably one of entire inhibition of gastric activity. Experimentally it has been shown* that in frightened animals the secretory as well as the motor functions are held in abeyance. Many of the conditions mentioned later under the head of "transient gastric retentions" fall in this group.

6. *Mechanical obstruction.* Foreign bodies seldom cause delayed emptying from within. The chief mechanical causes, practically speaking, are gastric new growths and cicatrices due to ulcer located at the pylorus. The most common extragastric causes are tumors and adhesions.

*Cannon, W. B.: Bodily Changes in Pain, Hunger, Fear and Rage, New York, D. Appleton & Co., 1915, p. 16.

Fig. 33.—Delayed gastric emptying. Film at 6 hours after opaque meal. A case of pyloric obstruction with large element of pylorospasm. Great improvement under gastric lavage. Note active peristalsis in gastric residue.

Fig. 34.—Delayed gastric emptying. Film at 6 hours after opaque meal. A case of pyloric obstruction due to adhesions following spontaneous healing of duodenal ulcer. Note absence of peristalsis in gastric residue. (Same case as Fig. 30.)

So much for a general survey of the factors in our problem. Actual clinical study* has shown that the immediate causes of delayed gastric emptying are: spasm of the pylorus in about 60% of cases, obstruction at the pylorus in about 25% of cases, and atony of the stomach in about 15% of cases; and, further, that the most common clinical disorders in which this condition is met with are, in the order of their frequency: ulcer, "autointoxication" of the migraine type and gastric carcinoma (both equally frequent), gastric ptosis and atony, and cholecystitis.

Principles of Treatment.—The principles governing the therapy of delayed gastric emptying may be summarized as follows:

1. Determination of the exact degree of gastric stasis.
2. Removal of stagnant contents.
3. Restriction of feeding in proportion to the degree of stasis.
4. Institution of direct measures to overcome the stasis.

1. *Determination of the exact degree of stasis.* In the condition under discussion investigation not only precedes but goes hand in hand with therapy. Inasmuch as delayed gastric emptying is a dynamic and not a static state, it is necessary to perform not merely a single test but a series of tests in order to decide on and to direct the course of treatment. Only in this way can it be determined whether the stasis is permanent or intermittent, complete or partial.

The first test to be employed is the aspiration of the fasting stomach. If food is recovered, it is fair to assume that a relatively high grade of stasis is present. Should the fasting stomach be empty, on the other hand, the demonstration of stasis will demand the use of a more delicate procedure. After this preliminary aspiration is completed, one of several motor meals may be administered. For the proper use of motor meals in general three requisites are

*Levy, I. H., and Kantor, J. L.: A Clinical Study of Delayed Gastric Emptying, Arch. Int. Med., 17: 476-491, 1916.

essential: (1) The motor meal should always be given on an absolutely empty stomach. This should be established by previous aspiration and lavage, if necessary. (2) The evacuation of the stomach (or its observation by the x-ray) should be undertaken exactly after the proper interval requisite for the evacuation of the particular motor meal employed. Of the motor meals commonly in use, the ordinary test breakfast (four Uneeda Biscuits and 400 c.c. water) leaves the stomach within 2 hours; the milk meal (400 c.c. milk) within 5 hours; the barium x-ray meal (four ounces barium sulfate in 400 c.c. fermillac) within 6 hours; and the Leube meal (small mixed dinner) within 7 hours. (3) The patient should take nothing by mouth after the administration of the motor meal and before its withdrawal.

The decision as to what motor meals to use in the study of a given case depends, in the first place, perhaps, on the result of the aspiration of the fasting stomach. Thus, if much food is recovered under these circumstances, one would hardly administer Leube meals for subsequent determinations, but would prefer some of the simpler combinations. As a matter of fact, whenever possible, it is wise to follow the preliminary aspiration by an x-ray study, not only because this is nowadays perhaps the best standardized single test of gastric motility but also because other important diagnostic data may simultaneously be made available. For repeated routine observations the writer favors the use of the milk meal because it is generally available and is much more readily recovered and measured than are some of the other meals in which solid food is administered. With the aid of this simple test of motor function, changes in the emptying time of the stomach can be very accurately followed by measuring the amount of residue after a course of aspirations and comparing a series of such figures.

2. *Removal of stagnant contents.* If, at the first aspiration of the fasting stomach, it is found to contain stagnat-

ing food, this should be removed as thoroughly as possible, as the first step not only in the study of the case but in its active management. Similarly, after the removal of motor meals throughout the course of treatment, the same care should be taken to evacuate the stomach completely. The reason for this is apparent when it is realized that the retention of a meal beyond the time limit ordinarily required for its expulsion can only work harm to the patient both by increasing the muscular demands on the stomach and by the development of fermentation.

The technic of gastric lavage has been described in detail in the first chapter. Suffice it here to say that the employment of the Ewald evacuator (stomach tube and aspirating bulb) is recommended, as is the temporary collection in separate containers of the successive washings, so that the progress of the lavage may be more accurately followed. There is no advantage in the use of medicated fluids, though the addition of a few drops of oil of peppermint to the lavage water may be refreshing to the patient. The lavage should always be continued until the return is clear and the greatest care should be taken to see that the stomach is left absolutely empty. In some cases, particularly where pylorospasm is suspected, an ounce or two of mineral oil may be injected through the tube after the lavage is completed, in the hope of "lubricating" the pylorus. In undernourished subjects olive oil may be used instead, on account of its nutritive value. When this is done it is well to have the patient delay the meal immediately following the lavage, so that as much oil as possible may leave the stomach before fresh food is introduced into it.

The best time for lavage, particularly in those patients who are up and about, is, as has been already mentioned, in the late afternoon, before the evening meal is taken. Thus, for example, if two glasses of milk are consumed at noon, the aspiration and lavage should take place at 5 or

6 P. M., depending on the degree of delayed emptying. In more severe cases, especially in those who are confined to bed and to some restricted plan of feeding, the aspiration may be done late at night, as advocated under the Sippy treatment of obstructive ulcer.

Aspiration or lavage is unnecessary in the morning, except in cases of pure hypersecretion, because no properly treated patient would be given an evening meal large enough to produce retention lasting all through the night.

3. *Feeding in proportion to the gastric stasis.* One of the most important principles in the management of delayed gastric emptying is that the amount and frequency of feeding be kept in proportion to the ability of the stomach to empty itself. It is obvious that the consumption of the ordinary large meals would do much more harm than good in cases of impaired motor function, first, because it is only a small fraction of this food that passes on into the intestine for absorption, and, secondly, because the retention of the excess, by its mere weight and bulk, produces atony, and by its fermentation, favors the production of gases and of chemically injurious by-products. It thus follows that in the ideal feeding of cases of delayed gastric emptying the meals should be of such bulk and character and they should be served at such intervals that no residue is carried over from one feeding to another. To be sure, in very tight pyloric obstructions such an ideal program might prove impracticable, but the fact remains, paradoxical as it may seem, that a patient can gain weight more rapidly on this restricted and precise plan of feeding, than he possibly could on his own more liberal but less rational diet.

It is always well to start the treatment of a given case with feeds that are smaller in amount than those which the stomach might seem able to evacuate between meals. It is just here that frequently repeated motor meals prove their value as direct guides for the details of treatment. In the

severely obstructed cases the diet should be reduced to the very minimum, the patient being put to bed and the full Sippy regimen being carried out as for obstructed ulcer, viz., three ounces of milk and cream every hour, powders between feeds, aspirations every night, etc. In less severely obstructed cases the patient may be put on the four meal a day plan of feeding, with a pint of milk and two eggs every four hours (at 8 A. M., 12 noon, 4 and 8 P. M.). As the gastric emptying improves, Uneeda Biscuits, cereals, and later soft vegetables, may be added to the diet. Food with residues, and meats, are very difficult to get rid of and should be avoided until the normal emptying time of the stomach is practically restored. As progress continues, the patient may be put on the *convalescent ulcer diet* and should finally graduate to the *standard bland diet.*

Inasmuch as most cases of delayed gastric emptying that have persisted as such for any length of time ("permanent gastric retentions") are associated with more or less gastric atony, it is important that no excess of fluids be taken, particularly at meals, the reason being, of course, that instead of going through at once as normally, the water is retained in the stomach with the rest of the food and thus simply increases the amount of the gastric stasis.

On the other hand, where the patient obviously suffers from dehydration, particularly in cases where there has been much vomiting, no time should be lost in supplying fluids, vicariously—i. e., by channels other than the mouth. Rectal, subcutaneous and intravenous routes are all available and should be utilized without unnecessary delay in all the severer forms of obstruction. For rectal use, Smithies' enema (see page 90) given by the Murphy (drop) method is excellent, for subcutaneous injections ordinary saline, and for intravenous infusions, either saline or 5% glucose solution are of the greatest value. Fluids containing glucose are particularly useful where acidosis from starvation is present. Sodium bicarbonate may also be

employed with advantage, as a systemic antacid, either alone in 5% solution or combined with Smithies' solution.

4. *Direct measures to overcome the stasis.* It has already been pointed out that in any given case of delayed gastric emptying it may be impossible to tell right from the start how much of the trouble is due to an actual organic diminution in the diameter of the pyloric sphincter, and how much to such secondary factors as spasm, inflammation, or muscular hypertrophy from overcontraction. It will be readily understood, from what has been said above, that any of the three last-named conditions may tend to disappear after the conscientious institution of such conservative measures as those outlined hitherto, viz., rest, proper feeding, and control of muscular spasm and incoordination by appropriate antispasmodics and lavage. Not uncommonly, indeed, an apparently severe case responds completely to careful diet and a course of aspirations. In other cases, again, most of the obstruction may be relieved and the rest taken care of fairly satisfactorily by continuing the above measures indefinitely. This state of affairs may apply also in permanent obstructions where operation is refused or rendered inadvisable for some special reason.

We come now, however, to those cases where from our clinical findings in general and from the failure of our therapeutic test in particular, we are forced to the conclusion that the obstruction is organic and permanent. Such is the case, for example, in tight pyloric obstruction from an old ulcer. Here the remedy must be direct and radical and consists in the surgical operation of gastroenterostomy—the manufacture of an artificial anastomosis between the stomach and the adjacent small intestine. In regard to this operation—which gives such immediate and brilliant results when done under the proper indications—it may be said, in a general way, that the more rapidly and simply it is performed, the better for the patient. In other words, very little is gained and much may be lost by com-

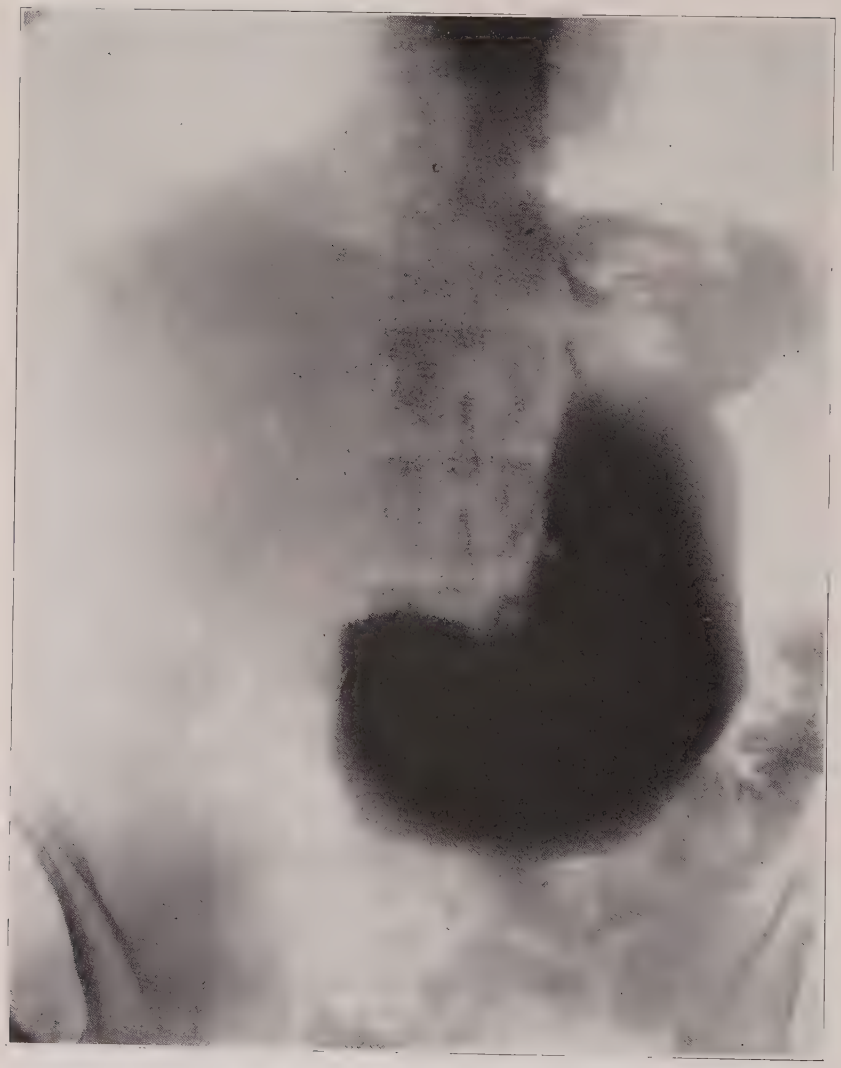

Fig. 35.—Typical gastroenterostomy. Tight pyloric obstruction due to old ulcer. Note failure of food to go through pylorus. Gastroenterostomy stoma indicated by arrow.

bining this procedure with attempts either to restore or destroy the patency of the pylorus (various "plastics," ligations, resections or excisions). The obvious exception to this rule is the condition of malignancy where the discovery of an early growth may invite and justify the most radical endeavors.

Two points in connection with the operation of gastroenterostomy still deserve mention. The first relates to the preliminary preparation of the patient; the second, to his after-treatment. Much can be done in the way of insuring a successful outcome to the surgical intervention by a thorough ante-operative cleansing of the stomach and restriction of diet. In fact the amount of food given by mouth can ofttimes be reduced to such a degree that the abolition of residues is completely accomplished. Where necessary, sufficient fluids can be supplied vicariously, as already described, and a certain amount of nutriment can also be introduced by these methods. By such measures the size of the stomach is decreased, the tonus improved, and the risk of postoperative distention is also considerably lessened.

Following the operation, on the other hand, the greatest care should be exercised in reeducating the upper digestive tract to the reception of food under the altered anatomic and physiologic conditions. It should be remembered that the gastroenterostomized stomach tends to discharge relatively large amounts of food rapidly into the proximal portion of the small intestine, and this, too, in individuals whose small gut has been kept for months and years in an unusually jejune condition. The mere recital of these facts should be sufficient warning against the too early resumption of large feedings. Sufficient time should be given for the readjustment; *festinare lente* should be the rule, and the institution of a graded course of feeding, as in ulcer diet, may well be the practice, in the management of post-gastroenterostomy cases. In general, the *standard bland*

diet may be regarded as the maximum range of feeding in gastroenterostomized individuals.

Transient vs. Permanent Gastric Retentions.—Enough has already been said to indicate the fact that for certain clinical purposes it may be profitable to distinguish between so-called transient and permanent gastric retentions. Perhaps at this point it may be well to recapitulate the salient features of this distinction. Transient retentions in general are those due to some temporary or recurrent cause, such as migraine, intoxications of various kinds, emotional and nervous shocks, and reflex spastic conditions arising from lesions either in the stomach, elsewhere in the digestive tract, or outside the digestive tract entirely. Permanent retentions, on the other hand, are those due to some local progressive organic disease, such as ulcer or growth, or to extraneous pressure, or to marked ptosis and atony associated with general asthenia or with some general wasting disorder.

The therapy of transient retentions is, on the whole, general and indirect, that is, it aims at the removal of the underlying cause, wherever possible, and treats the retention itself only as a secondary matter or incident in the clinical picture. In permanent retentions, on the other hand, the gastric stasis, no matter what its origin, becomes the chief concern of therapeutic endeavor. In this case direct relief of the obstruction, as such, is necessary, and, except in cases of predominating stasis and atony, surgical intervention is frequently inevitable.

Treatment of Special Conditions.—(a) *Minor transient retentions.* These are such as occur at the beginning of acute infectious diseases, from overeating, or from intoxication with alcohol or tobacco. They are generally manifested by the vomiting of food eaten "the night before" and take care of themselves in that manner. Should therapeutic interference appear necessary, an old-fashioned

emetic dose, or in those accustomed to it, a rapid lavage, will suffice for the purpose.

(b) *Migraine and similar "chronic intoxications."* That migraine attacks are accompanied by gastric retention is apparent from the frequent association of vomiting of stale food and the occasional relief that follows. The exact nature of the metabolic upset (?) that seems to cause both the headache and the gastric stasis is still unknown, but treatment along "general lines" and the correction of any associated defects, such as ptosis and atony, often lead to a diminution in the number and severity, if not to a complete disappearance, of the attacks in question (see also Chapter XV). Intestinal "autointoxication" from coprostasis has been shown to be associated with delayed gastric emptying, particularly in children (Kerley).* In such cases the correction of the constipation has been promptly followed by the disappearance of the gastric retention.

(c) *Ptosis and atony.* Whatever ptosis and atony results directly from organic pyloric obstruction is merely incidental and deserves no special consideration. Ptosis and atony *as the primary cause* of delayed gastric emptying is associated either (1) with a congenital state of universal asthenia and atony, or (2) with a progressive wasting disease that is not infrequently terminal. The treatment of the former condition has already been considered in the chapter on the treatment of ptosis and atony. It consists essentially in a carefully planned fattening cure, in support to the lower abdomen, in occasional lavage, and in general physical reconstructive and hydrotherapeutic measures. Delayed gastric emptying due to atony associated with a chronic wasting disease is, as a rule, not amenable to curative treatment. This condition is, perhaps, best illustrated in the dyspepsia accompanying advanced pulmonary tuberculosis. Therapy is, at the most, palliative in nature and is limited practically to dietetic

*Kerley, C. G.: Roentgen-Ray Demonstration of Abnormalities of the Gastro-Intestinal Tract in Children, Amer. Jour. Dis. Child., 19: 277-286, 1920.

measures. The food should be restricted in bulk and should be at once as nutritive and as palatable as possible.

It need hardly be mentioned that in neither of the last two forms of atony and ptosis is operative interference justifiable. Asthenics never make good subjects for surgery.

(d) *Gastric carcinoma.* Gastroenterostomy should be done early in cancer of the pylorus (even if a radical resection should prove impracticable) in order that much suffering incidental to the disease may be avoided. If this procedure is delayed too long, it may be refused on the ground that the patient will be unable to survive it and an opportunity will be lost to be of some slight service in the face of this dreaded disorder.

CHAPTER VIII

THE TREATMENT OF CONSTIPATION

General Considerations: Prophylaxis, Prognosis—Influence of Body Habitus—Diet—Psychic and Nervous Factors—Fatigue—Bad Habits—Physical Exercise

General Considerations: Prophylaxis, Prognosis.—Constipation is either organic or functional in nature. The organic variety, sometimes called *obstipation,* is by far the less common of the two. It is invariably due to some mechanical cause residing either within the lumen of the intestine (foreign body, fecal impaction), in its wall (new growth, stricture, kink, volvulus, abnormal redundancy) or outside the gut entirely (bands, adhesions, external pressure from exudate, tumor, glands, etc.). As a rule the course of obstipation is acute or rapidly progressive, it demands direct and highly specialized methods of treatment very commonly surgical in nature, and its detailed discussion need not detain us further, except to emphasize again its differentiation from the condition of "true" constipation, which we are about to consider.

Constipation, properly so-called, is always a functional disorder of the intestines. The recognition of this fact is of the greatest possible importance to the practicing physician because it indicates at once, in addition to whatever local measures may be used, the application of those broad principles of therapy that are absolutely essential to the successful management of the functional disorders in no matter what part of the body they may manifest themselves. From this point of view the physician cannot fail to take cognizance of such practical and important factors as bad hygienic practice, excessive emotional instability or

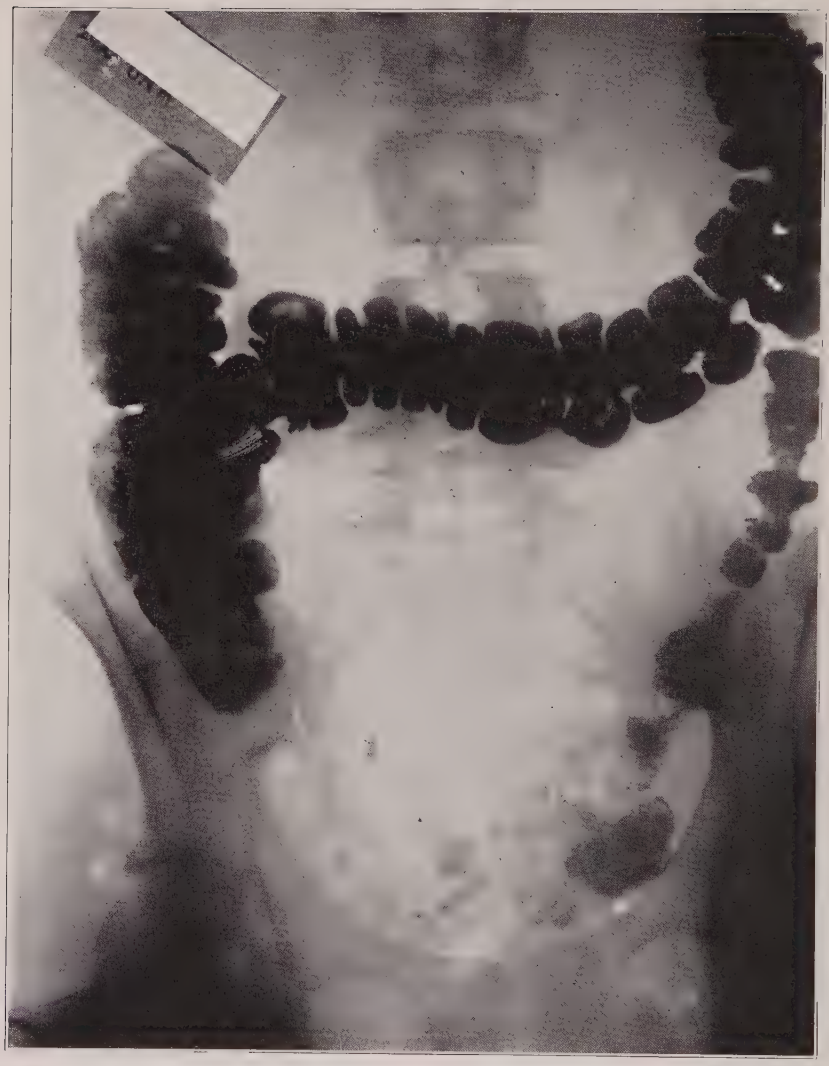

Fig. 36.—Appearance 24 hours after opaque meal (no stool).

Figs. 36-41.—Roentgen study of a case of constipation. The patient suffered from constipation associated with confirmed enema habit of 4 years' standing (enemas once or twice daily). Note gradual shift of intestinal contents from right to left side of colon, failure of the bowels to move for the first 96 hours, and the gradual resumption of increasingly free spontaneous evacuations. From the day on which this study was completed to the present time (one year) the bowels have moved naturally every day with but two exceptions. The treatment consisted entirely of eliminating the enema habit. Such cases are by no means uncommon.

excitement, and the common triad, overwork, fatigue, exhaustion.

It thus becomes obvious along what lines prophylaxis should be directed. General prophylactic rules for digestive hygiene have already been set forth with the recommendation that they be practiced from childhood (see page 17 ff.) For the prevention of constipation attention should be particularly directed to the first, fourth, sixth and seventh items as enumerated in the first chapter of this presentation. The first rule, *meals should be taken on time,* is important because no regular output of food residue can be expected unless there is strict regularity in the food intake. That the progress of food along the digestive tract takes place according to a very delicate block system, is evident from the fact, to cite but a single instance, that the introduction of food into the stomach is followed by the discharge of food from the terminal ileum into the cecum (ileopyloric reflex). *The normal dietary should include all the chief classes of foods,* providing for sufficient fats, green vegetables and fruits, because this insures the consumption of those materials most directly required for the normal excitation of intestinal peristalsis. The *drinking of a liberal amount of water daily* (up to two quarts for an adult) aids in keeping the fecal column from excessive dehydration. Finally, the custom must be cultivated even at the expense of great effort, of *having a spontaneous bowel movement at regular intervals,* preferably daily. This must be made a matter of absolute habit, so thoroughly ingrained in the personal routine from childhood, that all the subsequent demands of adult cares and business should prove insufficient to upset it.

Assuming then that those who follow the above precepts succeed in escaping constipation, what is the outlook for improving the lot of those who actually suffer from its evils? The prognosis as to cure depends on two factors: first, the length of time the condition has persisted, or what

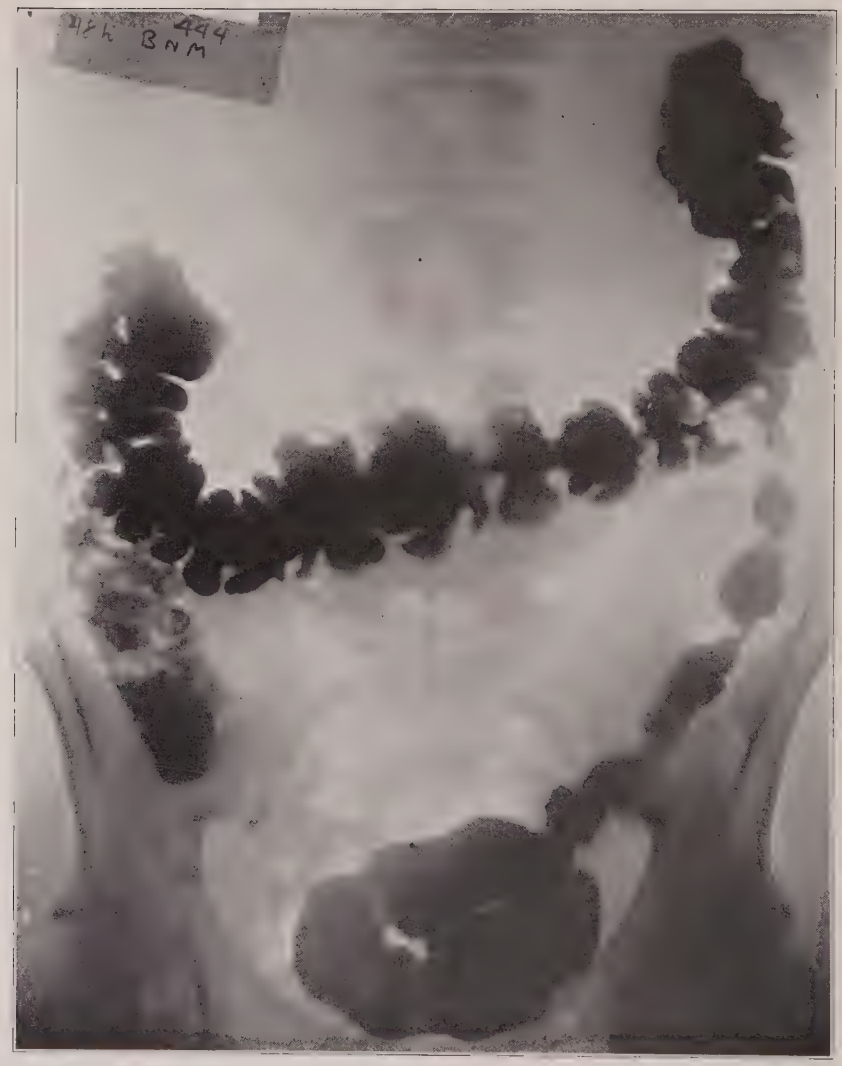

Fig. 37.—Roentgen study of a case of constipation. Appearance 48 hours after opaque meal (no stool).

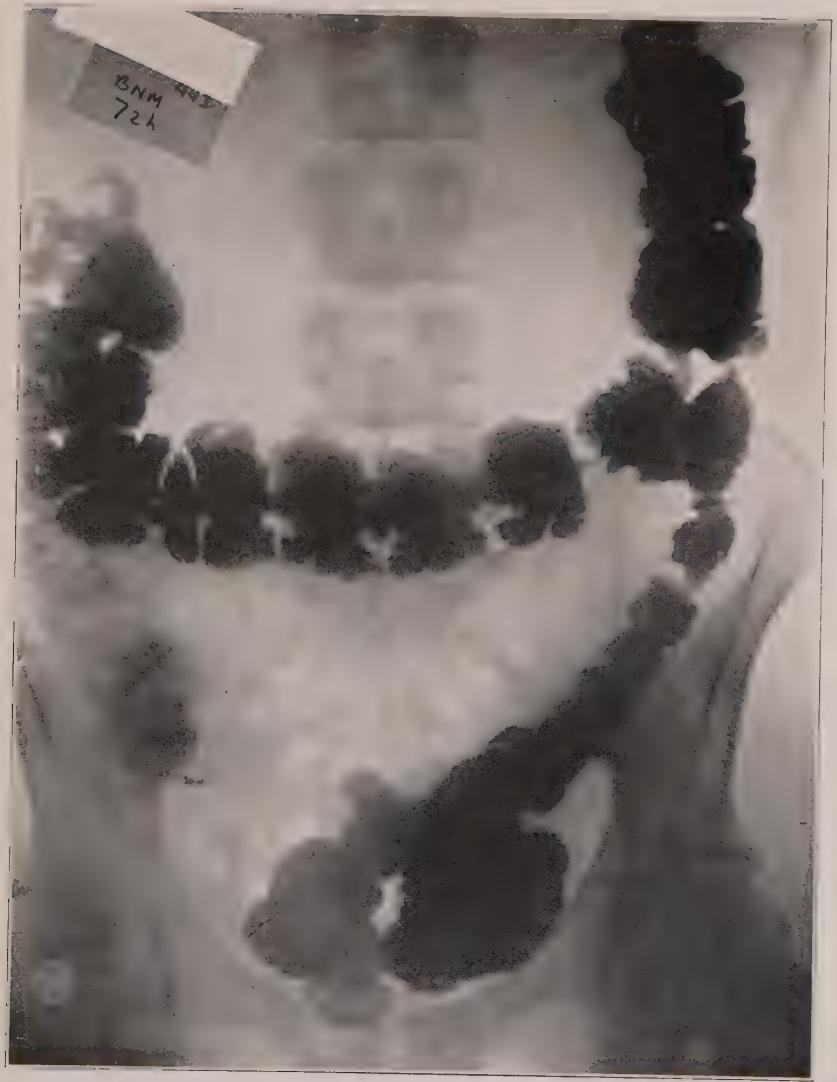

Fig. 38.—Roentgen study of a case of constipation. Appearance 72 hours after opaque meal (no stool).

Fig. 39.—Roentgen study of a case of constipation. Appearance 96 hours after opaque meal (one stool).

Fig. 40.—Roentgen study of a case of constipation. Appearance 120 hours after opaque meal (two stools).

Fig. 41.—Roentgen study of a case of constipation. Appearance 144 hours after opaque meal (three large and three small stools).

is commonly the same thing, the age of the patient; and, secondly, the degree of cooperation the patient is willing and able to give in carrying out a course of treatment. As regards the latter factor, it need hardly be pointed out that it is much easier to cure even an old patient who is conscientious in "playing the game" than a young one who, through willful negligence or some other reason, fails to put forth the earnest effort which alone can spell success in the treatment of this condition. In regard to the duration of the disorder, it is equally obvious that the sooner adequate treatment is started, the better the chance of cure, and particularly is it true that hygienic methods alone (diet, proper habit formation, physical exercise) are more likely to be effective the earlier in the course of the disease they are instituted. In other words, it may be given as a rough rule that persons under 40 or 45 years of age may be cured without the use of cathartics, whereas, those over that limit may need the temporary assistance of these drugs, or may never be cured in the sense of being able to do entirely without them.

Let us now take up some of the common factors associated with constipation and their treatment.

Body Habitus.—As has been repeatedly mentioned, there can be no question that body habitus exerts a definite influence on gastrointestinal motility. For example, in sthenic (stocky) individuals the bowels normally tend to be free, moving spontaneously up to three times daily. On the other hand in asthenic (slim) persons the bowels normally move but once a day or perhaps less often. This is not to say that visceroptosis is invariably associated with constipation, or that constipation in asthenics can only be relieved by correcting the ptosis, or even that correction of the ptosis alone is invariably followed by relief of the constipation. The fact remains, however, that constipation is more common in the one type than in the other, and that correction of the ptosis is always indicated in the treatment

of this condition. It is by no means a rarity for the simple application of a snug abdominal binder or corset to cure constipation of many years' standing. Furthermore, it should not be forgotten that the comprehensive treatment of ptosis implies also the improvement of the state of nutrition with the purpose of bolstering up the intestines from within, as well as the institution of appropriate methods of physical reconstruction wherever possible. For the details of treatment the reader is referred to the chapter on the *treatment of ptosis and the asthenic state.*

Diet.—Many cases of constipation can be relieved by attention to the diet. The importance of regular eating has already been pointed out. Suffice it here to add that people who "eat out" in restaurants, who travel for business, whose working hours are irregular (and this includes many physicians), are those who are most likely to receive the greatest benefit from a rigid adherence to the rule that all meals be taken on time.

Another error frequently met with is the consumption of a highly concentrated dry diet. With the exception of an occasional dish of soup or a cup of coffee many persons consume practically no fluids (especially during the winter) from one day's end to another. In such cases the drinking of water on a fasting stomach in the morning and at frequent intervals, preferably before meals, during the rest of the day, may be all that is necessary to cure the constipation. The early morning drink is of particular physiological interest and importance. At no other time during the day are both stomach and small intestine empty. Water passes down the digestive tract quickly under these circumstances and acts as a markedly efficient intestinal flush and stimulant to colonic peristalsis.

Simple starvation, or at any rate, inordinate food restriction, is also a rather common cause of constipation. The reasons for this are various. In some cases, to be sure, there is an actual physical cause preventing the consump-

tion of normal amounts of foodstuffs, such as obstructive disease of the esophagus or of the pylorus. Here the constipation is obviously secondary and cannot be cured directly. In other cases there is a dread of eating (phagophobia) because of the pain that follows, and this too may have an organic basis. In many individuals, however, various articles of diet are progressively eliminated as a part of a common form of neurosis, or even as an awkward attempt to cure the very constipation that is aggravated in the process. The remedy for this state of affairs is obviously the early restoration of an enlarged dietary. In many of these cases, particularly in those whose digestion is for some reason impaired, the prescription of the full *standard bland diet* suffices for this purpose.

It is a matter of every day experience that certain individuals habitually omit from their diet, in part or entirely, those foodstuffs commonly known to possess inherent qualities of increasing intestinal peristalsis. It is probably fair to say that a very large proportion—perhaps a majority—of cases of simple constipation can be cured by increasing the amount of these substances in the dietary. Such foods fall into the following classes (Hurst).*

1. Vegetable foods with cellulose residues which stimulate peristalsis chiefly by mechanical means. Examples are: All green vegetables, especially spinach and cabbage; asparagus and onions; carrots, parsnips, turnips and artichokes; tomatoes, water cress, lettuce, baked apples with skin; cereals such as oatmeal, whole meal, bran, graham, rye or corn bread.

2. Fruits which stimulate peristalsis by their indigestible skins and seeds, and by the presence of sugars and cathartic organic acids and salts. Examples are: Dried figs, raisins, prunes, dates, ginger, fresh plums, greengages, peaches, raspberries, currants, gooseberries, strawberries, pears, apples, grapes, oranges, melons.

*Hurst, A. F.: Constipation and Allied Intestinal Disorders, 2nd Ed., London, Oxford Univ. Press, 1922, p. 327, ff.

3. Sugars, in the form of fruit preserves, such as jam and marmalade.

4. Fats, which promote peristalsis chemically and mechanically. Examples of common fats are: Butter, which can be used in the preparation of vegetables, as well as on cereals, etc.; cream, with sweets and in porridge; bacon and other meat fat, which become liquid in the intestine; finally, olive oil, which may be taken "straight" or as mayonnaise or salad dressing and which is of particular value in emaciated individuals and in cases of spastic constipation.

In connection with the use of nutritive fats and oils, it should be pointed out that their laxative action depends entirely on the unabsorbed excess of oil present in the intestines and that in order to reach this point relatively large amounts of fats must be ingested, depending on the tolerance of the individual. For this reason this particular form of treatment is contraindicated in obesity as well as in all those individuals in whom even a slight amount of fat is likely to produce attacks of distress or so-called "biliousness."

For some reason or other milk is commonly believed to be constipating. To be sure there may be individuals who are rendered costive by this substance, but there are probably just as many in whom it acts as a cathartic. It is possible also that raw milk is more laxative than boiled milk, perhaps because of the greater bacterial content of the former. At any rate there seems to be no good reason for hesitating to prescribe milk, wherever indicated, in constipation (as in associated malnutrition) unless the patient himself has observed some clear evidence of costive action.

One of the most convenient ways of increasing the cellulose content of the diet is by the use of bran. This substance, which forms the outer capsule of the wheat kernel, has long been successfully used to correct constipation in farm animals. "The dose of bran is a considerable amount; tablespoonsful rather than teaspoonsful; two of

them rather than one; and taken several times, at least twice daily, best with meals, and indefinitely. We do not have here a cure for constipation in the sense that its use can, after a while, be discontinued. It is generally necessary to employ bran as a regular ingredient of the diet; hence the importance of making the patient enjoy its use, and the desirability of making it an integral part of the meals by means of cookery. Among the ways in which this may be accomplished are: Graham or whole wheat bread and crackers; bran with cream and sugar; bran, mixed up to one-third, with breakfast cereal; bran added to vegetable purees and to fruit sauces; bran incorporated in fish cakes, minced meat, etc." (Fantus.)* Bran is, of course, contraindicated in the various irritative gastric disorders and in cases of spastic constipation.

Another condition under which bran is of little use is where there is excessive bacterial digestion of cellulose in the intestine. Under these circumstances, constipation is not relieved but a troublesome flatulence is added to the patient's complaints. For such cases Adolf Schmidt has suggested the use of agar (see page 177).

Psychic and Nervous Factors.—The importance of psychic factors in constipation is self-evident. It is a matter of common knowledge that some people cannot possibly have a bowel movement when nervous or worried, or while actively engaged in the ardent and exciting pursuit of their daily occupation. Even mild excitation, such as that associated with travel and change of environment, is a potent cause of constipation in susceptible individuals, as are, of course, the grosser emotions of fright and anxiety. Anyone who had the opportunity, during the late war, of seeing whole squads of new recruits suffer from a preliminary period of constipation on entering military service will bear witness to the reality of psychic factors. Restoration of peace of mind is the keynote of sound therapy here as

*Fantus, B.: Useful Cathartics, Chicago, Amer. Med. Assoc., 1920, p. 57.

in all neuroses. It is in this way that Christian Science cures constipation,—an example of not only legitimate but perfectly sound therapeutics.

One of the peculiar facts in connection with constipation is the anxiety with which some individuals regard their failure to secure a daily bowel movement. Not only may an occasional omission be perfectly explicable on the basis of some of the causes just mentioned above, but a regular evacuation every other day, for example, may be regarded as quite within normal limits when not associated with physical discomfort or disability. Nevertheless, the situation may appear so serious to these apprehensive individuals as to lead to increased constipation from anxiety, on the one hand, or to some vicious habit, on the other. In all such cases it is a good practice to supplement a clear explanation of the real state of affairs and a reassuring manner with small doses of bromids, which are to be continued until the restoration of normal bowel function is complete. As a matter of fact, many patients have been cured by just this kind of treatment without the aid of any other measures whatever.

Fatigue may perhaps also be considered under the head of nervous factors. A sufficient amount of general bodily relaxation and rest is essential for the proper functioning of all the organs, and the bowels form no exception to the rule. Whether the fatigue products of metabolism are actually constipating or not, it is nevertheless clinically certain that many cases of costiveness are associated with insufficient rest, and particularly with insufficient sleep. This is very often the case in those who work at night and it may be necessary for such persons to resume the more usual habits of living before a cure is effected.

Vicious Habit Formation.—Perhaps the greatest perpetuating cause of constipation is that of vicious habit formation. Much of the trouble is due to early neglect of the bowels. Getting up too late to have the bowels move

before rushing to the school, shop, or office, and neglecting the calls of nature afterward because of preoccupation, laziness, or embarrassment, have frequently enough been pointed out as common experiences in this connection. To this should be added the uninviting condition, improper placing, or absence of heating facilities, in toilets in the poorer types of schools, shops, and tenements—conditions that demand remedy at the hands of the appropriate social, industrial, educational, or administrative authorities.

Once the chain of regular bowel evacuations is broken, once the fecal stasis begins to cause discomfort whether by reflex mechanical, by nervous, or by toxic causes, it is but a short step for the sufferer to seek artificial methods of relief. He embraces thenceforth either the cathartic or the enema habit, or both, and his constipation bids fair to remain fixed for life. Physicians, too, are not without blame in this matter. A prescription for a cathartic, no matter how well fitted to the temporary needs of a patient, may become just as persistently and unintelligently employed as any patent nostrum. Similarly, the administration of cathartics or enemas postpartum, or after operations, may often be the starting of a vicious habit.

The first and most important step in the treatment of the cathartic or enema habit is the complete elimination of the offending measures. If it is carefully explained to such patients that it will take several days for the bowels to form a normal, solid fecal column from its usual watery or mushy contents; that nothing serious can happen during the interval; that even if some discomfort is experienced, it is well worth the trouble for the sake of achieving a permanent cure; if in short, these patients are completely convinced that they can be cured and that a serious and scientific attempt is being made to do so, most of them will readily cooperate and will refrain from seeking relief in their former manner. To be sure, in some patients over 45, and in very apprehensive, unstable, and unreliable indi-

viduals, such an apparently abrupt and "heroic" treatment may prove impracticable and one may then be forced to continue the use of cathartics for a period as will be described later. Nevertheless, it is really surprising how often a bowel that has been irritated daily for years will take on a new lease of life, as it were, and resume its function of delivering formed stools spontaneously within a week, perhaps, of its escape from medication.

The interval between the discontinuance of artificial aids and the first spontaneous bowel movement is commonly one of some anxiety to the patient and perhaps to the physician as well. All the hygienic aids already mentioned, as well as those about to be described, should be brought into play, and in addition, bromids should be exhibited in order to allay nervous anxiety and irritability during this interval. Most of all, the patient should begin from the start to cultivate the habit of regular bowel evacuation. Selecting some hour most convenient to himself (preferably soon after breakfast), he should try to have a bowel movement at that time precisely, day after day, no matter how long it may take before the regular habit is established. Desire for stool arising at any other than the prescribed time should be absolutely disregarded, for otherwise the bowel could never be trained back into the desired regularity of action.

It may be of interest to point out that the restoration of normal bowel function is ofttimes rendered much easier for the patient when done under x-ray control. It is quite possible that the psychic effort of visualizing the daily progress of the barium-fecal column toward the rectum is sufficient to bolster up confidence in the ultimate successful achievement of a spontaneous bowel movement.

Physical Exercise.—In the normal subject the exercise incident to making the morning toilet is frequently sufficient to provoke a desire for stool by breakfast time or soon thereafter. In the constipated individual, on the

other hand, much more specialized effort in the way of exercise is obviously necessary. The object of such exercise is to strengthen the voluntary muscles of defecation and to cause rapid changes in intraabdominal pressure. To this end all movements involving the abdominal and thigh muscles are particularly advantageous. Hurst* recommends especially the following exercises: hill-climbing, rowing, skipping, swimming, horseback riding, gardening, bowling. He also advocates Swedish movements, as follows:

Lying: 1. Sit up and bring fingers to feet.
2. Raise thighs with legs extended.
3. Draw in and push out abdomen.

Standing: 1. Bend forward with knees stiff and touch feet.
2. Bend to side, touch feet with hand.
3. Hands on hips, twist body around.
4. Lean back and move body about pelvis in a circle.
5. Goose step standing.
6. Hands on hips, up on toes, squat.

Massage is of value particularly where the intestinal musculature is weak. It is best performed by the patient himself rolling a heavy weight about his abdomen. The best time is in the morning before breakfast.

In all forms of exercise the following points are of importance: (1) Fatigue from overexercise is much more harmful than no exercise at all. (2) Exercise must appeal to the patient as pleasant and exhilarating to do any good. (3) A little work done regularly is better than much done sporadically.

*Hurst, A. F.: Constipation and Allied Intestinal Disorders, 2nd ed., London, Oxford Univ. Press, 1922, p. 377, ff.

CHAPTER IX

TREATMENT OF CONSTIPATION
(Continued)

ATONIC CONSTIPATION—DIET RECOMMENDED—SPASTIC CONSTIPATION—MINERAL OIL—OIL INJECTIONS—SOPER TREATMENT—ANAL SPASM—DYSCHEZIA—REDUNDANT COLON—MUCOUS COLITIS

Special Forms of Constipation.—Heretofore we have dwelt on the various principles underlying the treatment of constipation in general. It is convenient at this point, in order to aid further discussion, to distinguish at least five forms of constipation which are clinically prominent. These are:

1. Atonic constipation.
2. Spastic constipation.
3. Dyschezia.
4. Constipation associated with redundant colon.
5. Constipation associated with mucous colitis.

The treatment most appropriate to each of these special forms may now be considered.

Atonic Constipation.—Atonic constipation is etiologically associated with one or more of the following factors:

1. Congenital intestinal atony or hypoplasia occurring either alone or as a part of asthenia universalis.

2. The abuse of cathartics and enemata.

3. A distal spastic constipation, in which the atony is limited to the colon proximal to the point of spasm.

When the atony is due to a distal spasm (third group), the former condition should be disregarded in favor of active treatment aimed at relief of the spastic contractures. Otherwise, in cases of atonic constipation the guiding principle is that of stimulation. Whether the primary defect be assumed to lie in a congenital muscular hypoplasia or

in a defective neuromuscular mechanism of the colon, the direct object of treatment is to increase the inherent capacity for normal and effective propulsion of the fecal column. It may perhaps be possible, judging from certain studies made on soldiers, that the intestinal musculature may be made to undergo actual hypertrophy in keeping with the general body musculature as a result of rigorous physical training. Be that as it may, the policy of stimulation, as carried out in every day practice, should include practically all the methods of treatment heretofore described, particular emphasis being laid upon increased water consumption, bulky diet, the institution of regular bowel habits, and the discontinuance of all artificial aids to evacuation. Where the subject is unusually malnourished or asthenic the stimulation, appropriately modified, should be combined with a fattening cure and with the correction of ptosis by abdominal support.

An outline of treatment that has worked well in practice is as follows:

Management of Constipation (Atonic)

(Vanderbilt Clinic Diet Lists)

General Rules:

1. Have a regular time for meals.
2. Have a regular time for going to the toilet.
3. Take no cathartics or enemas unless ordered.
4. Take a daily walk in the open air.
5. Practice the exercises prescribed.

Exercises:

(Each to be done fifteen times)

1. Knees stiff, bend forward and touch the floor.
2. Bend back from hips.
3. Bend to the right and left from hips.
4. Twist to the right and left on hips.

Diet: Breakfast

Any fruit (fresh, cooked, preserved or dried).
Dry or cooked cereal with cream or butter.
Bread (graham, rye, bran, whole wheat or corn).
Marmalade, jelly, or jam.
Coffee with cream and sugar.

Lunch and Dinner

Soup (without milk or flour).

Fish, meat, eggs (eat as much fat as possible).

Vegetables, fresh or canned. Greens, especially those with residues (celery, lettuce, spinach, cabbage, etc., up to two cupfuls a day).

Salads with oil.

Desserts: Fresh or preserved fruits are best. Jellies, pies (except undercrust), water ices. Ice cream in small amounts.

Bread (see breakfast) and butter.

Fluids

At least one glass of water *on arising* and otherwise freely up to eight glasses daily.

Carbonated waters, buttermilk, fermented milk, cider.

Avoid or use in moderation

White bread, noodles, macaroni, cake, rice, barley, potatoes, cheese, tea, milk (only in some cases).

Spastic Constipation.—Spastic constipation is more common than is perhaps generally recognized. It is characterized by the existence of a state of increased tonicity of the large intestine. The distal portion of the gut is the part usually involved, the condition affecting either the entire colon from the hepatic flexure onward, or certain special areas such as the descending colon, the pelvic (sigmoid) colon, the pelvi-rectal flexure, or the anal sphincter alone. In the last-named instance local lesions may play an exciting rôle (fissures, ulcers, hemorrhoids). As already mentioned, spastic constipation may be associated with atony of the proximal large intestine, the cecum and ascending colon acting as reservoirs for large accumulations of feces which are passed, small portions at a time, beyond the areas involved in the spasm. Clinically, this condition may be associated with daily, but quite insufficient, evacuations.

The common symptoms of spastic constipation are abdominal cramps, general or localized in the left lower quadrant, often increased in intensity by defecation and still more by catharsis; peristaltic unrest; and the passage of small thin stools, or of separate hard lumps like marbles

Fig. 42.—Spastic colon. Film at 48 hours after opaque meal. Note formation of separate scybalous masses in distal colon. A common appearance.

(sheep dung stools). Examination of the left lower abdomen often reveals an easily felt descending colon which may contain one or more scybalous masses, and which may relax and contract under the palpating fingers. This con-

Fig. 43.—Spastic colon. Film taken immediately after opaque enema, before bowels had moved. Note tonic appearance of colon with retention of haustrations and considerable ileocecal incompetency. See Fig. 44.

dition is not infrequently associated with a distended, gurgling, and sometimes tender cecum. The anus may feel tight to the examining finger, while inspection of the pelvic colon with the sigmoidoscope often reveals the presence of

an irritable, spastic condition which may prevent the introduction of the whole length of the instrument (ten inches).

Fig. 44.—Spastic colon. Same as Fig. 43. Film taken after patient had tried to move bowels thoroughly following opaque colon enema. Note retention of greater part of injection and marked increase in depth of haustrations. In normal individuals the distal colon is completely emptied under these conditions.

In short, we are dealing with a condition of colonic irritability very similar to that of "gastric irritation" previously considered. The principles of treatment are also

Fig. 45.—Spastic colon. Spastic rectum. Film at 24 hours after opaque meal; one stool. Note depth of haustrations in transverse colon. Black arrow points to rectal spasm. White arrow points to barium in appendix which is commonly filled in spastic constipation.

Fig. 46.—Anal spasm. Note wide dilatation of distal colon (moderate "megacolon"). Film immediately after opaque enema. See Fig. 47.

Fig. 47.—Anal spasm. Same case as preceding. Film taken after patient had tried to move bowels thoroughly following opaque colon enema. Note failure of distal colon to empty. In normal individuals the distal colon is completely evacuated under these conditions.

very similar, involving rest, smooth diet and sedative medication. In order to obtain as much rest as possible in patients who must keep on working, it is well to break the nervous strain under which they commonly labor by periods of deliberate relaxation after meals, at the time when the bowels should move, and for as long a stretch at night as possible. A warm daily bath may help considerably in this direction. Instead of a coarse stimulating diet, as that recommended for the atonic form of constipation, the food should be particularly bland and nonirritating. For this purpose the *standard bland diet* is very well adapted.

Sedative measures are both general and local in character. Of the general sedative drugs commonly employed, bromids before meals and bromids and chloral at night give good service. Codein, and in some cases marked by extreme irritability, morphin may be required before the restoration of normal bowel action is consummated. Belladonna (atropin) is here of special value, particularly where its toxic effects do not spoil its action. Many cases of spastic constipation are cured by belladonna without the help of any other agent.

Chief among the local measures are the emollients, particularly the oils. These may be administered either by mouth or by rectum. By mouth both olive oil and mineral oil are of value. As already explained, the former is absorbed to the point of tolerance and may, therefore, have to be taken in relatively large doses to be available for "intestinal lubrication." Where desired, it may be combined with mineral oil.

Mineral oil, being indigestible, acts in the same way as does vegetable oil when the latter is given in excess, i. e., it softens the feces by mixing with them in the form of small globules. The dose required varies considerably in different individuals, the average daily amount ranging from one to three ounces. It is better taken in two or three doses, rather than all at once. The daily portion may be

safely increased by one-half ounce at a time until the excess appears in the form of a leak from the anus. If, by this time, satisfactory bowel action is not achieved, it may be assumed that the patient will not respond to the use of this substance in any amount. In some instances mineral oil is not acceptable on account of excessive gastric sensitiveness to this form of medication.

For rectal administration both forms of oil have been recommended. The vegetable product* is, perhaps, the more popular for this purpose. The results of this form of application are on the whole very gratifying and are due in part to actual lubrication and soothing of the irritated and inflamed mucosa, and in part to interference with water absorption and with the formation of dry, hard fecal masses. The simplest and best procedure is to administer small oil injections, to be retained over night in the colon. Depending on the patient's tolerance, from two to four or more ounces of oil, warmed to body temperature, are introduced in the recumbent position just before retiring. For the actual injection a small hand syringe may be employed, or a rectal tube with funnel. A very useful, though somewhat more expensive apparatus, is the enemator of Dudley Roberts. This consists essentially of a curved rectal tube of hard rubber, the end of which is olive shaped to make it self-retaining, attached by a convenient length of soft rubber tubing to a Politzer bag provided with a stopcock at its opening. The curve of the rectal tube enables it to be readily passed from the front of the body to the anal opening, where by a slight traction it enters the anus in the proper direction. It is claimed that this form of tube is much less

*Three varieties of vegetable oils are available: olive oil, cottonseed oil, and corn oil. Olive oil is expensive. Some preparations of cottonseed oil are irritating because of the fatty acids that may be present. These can be completely removed (Soper) by boiling with calcined magnesia and bismuth subcarbonate in the proportion of four grams of each to the pint of oil, and then straining.

The writer has found that the corn oils commonly used in cooking, such as Mazola, are widely available, inexpensive, and perfectly satisfactory in their action.

awkwardly introduced than is the ordinary form by reaching around the buttocks.

Oil injections should be made in full doses nightly during the first two weeks or so of treatment. When satisfactory spontaneous stools recur regularly each morning, the amount of oil should be reduced for the next week or two. If everything still goes well, one or two injections may be dropped during the following week, and every other injection during the week after that. Finally, an injection should be taken only on those evenings when the bowels are not moved during the daytime.

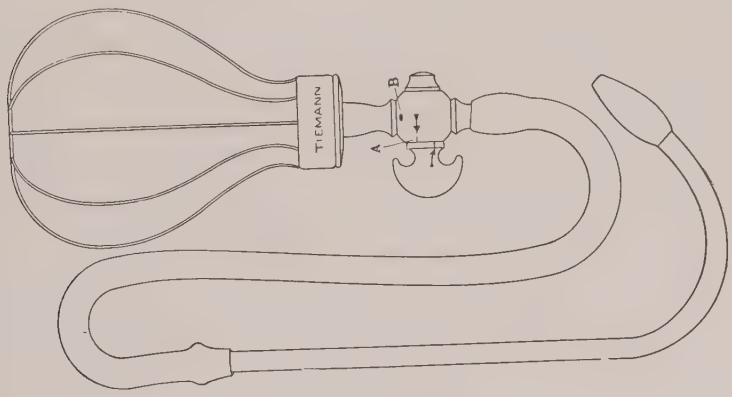

Fig. 48.—Enemator.

Of considerable interest in the therapy of intestinal spasms is a form of direct intraintestinal treatment recommended by Soper. A sigmoidoscope is introduced to the point of spasm and direct applications are made "to the contracted area by means of cotton applicators soaked in a saturated solution of magnesium sulfate. When the contractures are above the reach of the sigmoidoscopic tube, a soft catheter is introduced through the instrument and one to two ounces of the solution are injected. In moderate contractures six to eight treatments usually suffice to overcome the spasticity and permit the restoration of normal colonic function. Severe cases may require a large number

of treatments spaced over a period of two to three months' time. The same treatment is efficacious in spastic contractures of the rectum. It must be noted, however, that the magnesium sulfate solution has no effect whatsoever upon sphincter spasm of the anal canal. The indications for treatment of sphincter spasm are direct instrumental dilatations and appropriate treatment of the accompanying lesions of the mucosa."*

Fig. 49.—Proctoscopic set for treatment of spastic colon. Showing 10-inch proctoscope, 12-inch cotton applicators, 15-inch catheter stiffened by introduction of applicator, and lubricant. The injection is made after the catheter is put in place, the proctoscope removed, and the applicator withdrawn. An ordinary 30 c.c. glass syringe is used for the injection.

The method outlined above has the advantage of precision of application and ease of execution. In cases of postoperative distention, associated with distal colonic and rectal spasms, and where obviously a proctoscopic manipulation would be out of the question, an enema consisting of

*Soper, H. W.: Constipation, in Nelson Loose-Leaf Medicine, New York, 1920, Vol. 5, p. 413.

Fig. 50.—Wales bougies. Sizes 7, 8, 9, commonly employed in rectal therapy.

about three ounces of magnesium sulfate solution may prove very useful in relaxing the contractures and thus relieving the distention and the gas pains. Soper prefers to use his direct intraintestinal therapy in all cases of spasticity of the lower colon, and employs oil enemata only when the magnesium sulfate method of treatment is not feasible.

In those cases where the spasm is limited to the anal sphincter a careful inspection should be made to rule out such local sources of irritation as hemorrhoids, fissures, parasites, etc., and where found these should be given appropriate treatment. Otherwise, in simple spasm the local treatment consists in breaking down the excessive sphincter irritability by a series of gradual dilatations. For this purpose Wales bougies are admirably suited and give excellent results when used with sufficient perseverance.

Dyschezia.—In some cases of constipation it is found, on direct examination, that the rectum is practically always filled with feces. Further study (as by the x-ray) reveals the fact that there is no delay in the propulsion of the stool through the proximal colon; it is only when the most distal portion is reached that progress ceases. In other words, we are dealing with a condition where that portion of the gut charged with the actual expulsion of the fecal matter fails to act. The pathogenesis of this disorder, known as dyschezia, has been described by Hurst* as follows: "The habitual neglect of the call to defecation leads to the accumulation of feces in the rectum and pelvic colon, which become gradually more and more distended. The distention diminishes the tone and impairs the contractility of the musculature; as the force required to empty the rectum when overdistended with feces, is much greater than that required to empty it under normal conditions, the weakened muscular coat is incompetent to do its work, and, even

*Hurst, A. F.: Constipation and Allied Intestinal Disorders, ed. 1, London, Oxford Univ. Press, 1909, p. 117.

if a great effort be made, the evacuation remains incomplete. In time the musculature of the pelvic colon and rectum may become so profoundly atonic and paretic, that

Fig. 51.—Dyschezia. Film taken 48 hours after opaque meal; 2 small stools.

it can never be restored to its normal condition." Dyschezia may also develop secondarily to any condition which causes pain during defecation, such as inflamed or throm-

Fig. 52.—Dyschezia. Typical appearance in severe case. Film taken 120 hours after mouth meal; 2 small stools. Associated spasticity of pelvic colon. Arrow points to appendix commonly filled in these cases.

Fig. 53.—Dyschezia. Film taken 72 hours after opaque meal; one small stool. In this case the inability to evacuate involves not only the rectum but the pelvic loops as well—so-called pelvi-rectal type.

botic hemorrhoids, anal ulcers or fissures, pelvic peritonitis, etc.

The treatment of the secondary form of dyschezia, just mentioned, is obviously that of the underlying condition; once this is removed, the constipation usually disappears spontaneously. In general, the employment of cathartics in the treatment of dyschezia can only do harm, since they serve merely to irritate the colon whose function is normal, whereas they have no effect on the rectum which is the seat of the trouble. It is clear, therefore, that success can be achieved only by keeping the rectum and pelvic colon as free from fecal accumulations as possible. This can best be accomplished by the regular employment of enemata. The amount and nature of the injection must be varied to suit the individual taste. Sometimes oil works well, sometimes water does better. Where much stimulation is required, cold water in relatively large quantities may be necessary; ordinarily, however, the injection of a pint or two of plain warm water suffices. In cases showing but a slight impairment of function, the use of a glycerine suppository may be all that is needed. In infants the insertion of a finger tip or of a small bent glass rod into the anus, frequently serves to set up a satisfactory desire for defecation.

Redundant Colon.—Increasing experience with the roentgen study of constipation has shown a surprising number of instances of a previously undiagnosed, or indeed frequently misdiagnosed, condition, viz., redundancy of the colon. This abnormality, undoubtedly congenital in nature, involves most commonly the distal, i. e., the descending, iliac, and pelvic, colon, but it may also extend proximally as far as the cecum.

In one such case studied by the writer the cecum was low, the midtransverse colon was angulated sharply downwards, resting on the floor of the pelvis, and the descending colon described a complete loop at its lowermost portion. Fifty-eight hours after the ingestion of the barium meal,

Fig. 54.—Elongation of proximal colon in redundancy of distal colon. Film taken 24 hours after mouth meal. Note low cecum and excessive distances from cecum to hepatic flexure, and from mid-transverse colon to splenic flexure. Case described in text.

and despite two small bowel movements, over three-quarters of the material was still retained in the colon. In another case, twenty-four hours after mouth filling, the ver-

Fig. 55.—Redundant colon. Film after opaque enema. Note complete loop of descending colon and redundancy of proximal transverse colon.

tical distance from the low-lying distended cecum to the hepatic flexure was exactly one foot, and from the ptosed mid-transverse colon to the top of the splenic flexure was

Fig. 56.—Redundant colon. Film at 24 hours after opaque meal. Note loop of descending colon, partly filled with gas. A not uncommon cause of localized discomfort and distention.

just two feet. (See Fig. 54.) A barium enema revealed the presence of eight distinct twists and angulations, most of them in the pelvic colon.

Fig. 57.—Redundant colon. Film after opaque enema. Note repeated looping and spasm of pelvic colon.

It seems probable that the existence of such mechanical hindrances in the *distal* colon must account for much of the distention, ptosis and elongation that is found in the *proxi-*

Fig. 58.—Redundant colon. Note redundancy of transverse and descending colon. Film taken 24 hours after opaque meal.

mal portion. Patients suffering from colonic redundancy often give a history of constipation dating back to childhood. The interval between spontaneous bowel movements may be three or four days or more. In women the condition is frequently aggravated by childbirth. There is often discomfort in the lower right quadrant, characterized as dull, dragging, sticking in nature, and increased by bodily exercise. The cecum can often be felt and may be gurgling and tender. Not infrequently the appendix is removed to relieve the right sided distress, but needless to say, without benefiting either this or the underlying constipation. The condition may be familial and hereditary.

Cathartics are often ineffectual and add unfruitful colics to the discomforts otherwise present. Enemas, though somewhat more successful, are not uncommonly "lost" in the long, tortuous, and capacious colon.

The diagnosis of this condition by physical examination is difficult. Examination of the rectum reveals no fecal accumulation, for the delay is invariably above the pelvirectal flexure. It is only by careful roentgen study, both by barium meal and by opaque enema that the existence and the extent of the colonic redundancy can be accurately determined.

In the treatment of this type of constipation violent purges should be strictly avoided lest they bring on mechanical ileus. A rough, bulky diet is usually well tolerated and forced water drinking is generally necessary to prevent undue drying of the feces. Mineral oil by mouth often gives very good results. The injection of fairly large quantities (six to eight ounces) of oil to be retained overnight is a useful procedure, as is an occasional colonic irrigation to remove old fecal accumulations. It is not essential for the bowels to move daily, a stool every forty-eight hours being quite compatible with a very fair degree of comfort.

If the above measures fail, a compromise with the cath-

artic habit is justifiable. Only the mildest laxatives should be selected, such as cascara or phenolphthalein, and these should be given as always, in the smallest dose compatible with satisfactory action.

Surgical removal of part or all of the large intestine (partial or total colectomy) as well as short-circuiting operations (unilateral or complete colonic exclusion with ileosigmoidostomy) have been practiced in these cases. All such procedures are attended with a grave mortality. Unilateral exclusions are often worse than useless, owing to the tendency for feces to dam back into the blind pouch of the intestine. In the writer's opinion operative treatment of constipation is seldom justifiable, but if such an intervention is decided upon, the safest and most promising procedure would appear to be a two-stage extraperitoneal resection (Mikulicz), as is commonly practiced in bowel operations for organic diseases.

Mucous Colitis.—Mucous colitis is a functional bowel disorder (neurosis) characterized by the presence of large amounts of mucus in the stool and associated with constipation or at least incomplete bowel evacuation. In severe forms the clinical picture includes abdominal colics, spastic constipation, intense putrefactive toxemia, and various widespread neurotic manifestations. Very often the presence of mucus in the stool is not noticed by the patient and can only be elicited by careful questioning on the part of the physician.

The treatment of mucous colitis involves:

1. Control of the underlying constipation.
2. Control of mucus accumulation.
3. Control of the colic.
4. Improvement of the nervous and general health.

1. The underlying constipation is to be controlled by the measures already outlined. If spasticity is marked, or if the colon is very sensitive to irritants, it is well to avoid the use of rough foods. Indeed, these may be more harm-

ful under such circumstances than mild tonic laxatives, such as cascara agar or phenolphthalein agar. Otherwise the general rule is that the diet should be built up as quickly as possible (see diet in atonic constipation) so that colonic tolerance to the ordinary food irritants should be increased rather than diminished. In general the oils are well borne in mucous colitis, both when given by mouth and by rectum. Overnight instillations of warm olive, cottonseed or corn oil are particularly beneficial, not only for the constipation, but for the removal of mucus as well.

2. To overcome the accumulation of mucus, a weekly purge of castor oil or of calomel is recommended. Colon irrigations are of decided benefit. At first the irrigations may be given daily or every other day for one or two weeks, then twice a week for several more weeks, and finally once a week, until the mucus is eliminated. Before the irrigation proper, a cleansing enema should be given to remove whatever fecal accumulation may be present. Plain hot water in amounts ranging from twelve to twenty-four quarts should be employed for the irrigation. The water should be run in slowly, the reservoir being two feet above the patient. Bastedo* points out that an irrigation should be regarded as a failure if no water is retained to be evacuated after the irrigation is over, or if the water returns clear throughout; for obviously, in such cases, the liquid has failed to get past the spastic descending colon or sigmoid. Where spasticity is prominent, local intraintestinal applications of magnesium sulfate are very well worth trying (see page 153).

Transduodenal lavage with a hypertonic solution, made up of 0.9% each of sodium chlorid and sodium sulfate as recommended by Jutte† has been practiced by the writer with good results in some cases. This method has the advantage over colonic irrigations in that the fluid is intro-

*Bastedo, W. A.: The Treatment of Mucous Colitis, Jour. Amer. Med. Assoc., 74: 240-244, 1920.

†Jutte, M. E.: Auto-Intoxication and Its Treatment, by (Trans-) Duodenal Lavage, Amer. Jour. Med. Sc., 153: 732-738, 1917.

duced in the "physiologic" direction, i. e., from above downward. One and one-half to two quarts suffice for the injection. The solution should be hot (110 degrees in the reservoir) and should be introduced slowly (two quarts in 20 to 30 minutes) by gravity. There is no discomfort whatever and the treatment is generally followed within an hour by several free, watery evacuations.

3. The treatment of the attacks of colic necessitates active sedative and relaxing measures. Rest in bed; bromid by mouth; atropin and codein by hypodermic injection, all in full physiologic doses; together with hot applications to the abdomen in the form of hot water bag, electric pad, poultice or stupe, or a hot bath, are among the most useful measures (Bastedo). In addition, the mucus accumulation must be gotten rid of, whether by castor oil by mouth, or by colonic irrigations, or by the administration of oil enemata.

4. For measures directed toward the improvement of the nervous and general health, the reader is referred to the preceding sections dealing with the general management of the neuroses. Inasmuch as increased fatiguability is a characteristic of patients suffering from mucous colitis, it is essential that they should get plenty of rest and sleep and that they should avoid strains and excitement of all sorts, mental, physical and emotional.

CHAPTER X

TREATMENT OF CONSTIPATION
(Concluded)

Indications for Cathartics—Principles of Administration—Alkaloids—Vegetable Cathartics—Saline Cathartics—Mercurials—Substances Adding Bulk to Feces—Glandular Therapy

The Cathartic Treatment of Constipation: Indications.—It has already been stated that under certain conditions the hygienic or acathartic treatment of constipation may not meet with absolute success. It is important to recognize its limitations lest unnecessary discouragement follow an unwise selection of cases for treatment. Unfavorable conditions for the hygienic or radical cure of constipation may be said to obtain in the following groups of persons:

In the first group may be placed those individuals who, for whatever reason, prove to be poor cooperators; who are in general unstable, unreliable, quite incapable of making any effort to help themselves, if such an effort implies sacrifice, patience and perseverance. Left to themselves, such folk will unquestionably go from bad to worse and will fall victims to the cathartic drug habit in its worst aspect. It is obviously much better for the physician to take what hold he can and deal out drugs, if he must do so, mixed with at least some degree of discretion.

Another group of patients is composed of elderly individuals in whom long-standing vicious habits and an utterly exhausted intestine combine to make any thought of a radical reconstruction hopeless from the beginning. Such patients should be fitted with an appropriate cathartic which they can continue to use for the rest of their days, if need be. In this group, also, should be included the very

aged, in whom the edentulous state, or a purely senile infirmity, justifies the permanent use of an artificial aid to intestinal evacuation.

In still a third group may be included all chronic invalids in whom the constipation figures as perhaps the least among other ailments. Old cardiacs, diabetics, paralytics, are obviously not good subjects for vigorous therapeutic procedures, and a compromise in their case is not only justifiable, but quite necessary.

Finally, there remains a small proportion of intractable cases who simply fail to respond to hygienic treatment.

In all of the instances above considered, the use of cathartics bids fair to be practically permanent. Needless to say, cathartics may also be used entirely for temporary purposes. Thus, there may be occasions when it would prove advisable to invoke the aid of laxatives in instituting a more rational plan of treatment. This is practically true in those individuals who by temperament, ignorance, or sheer obstinacy cannot be expected to submit gracefully to a radical interference with their fixed habits of constant catharsis. By emphasizing the hygienic factors involved in the treatment of constipation, and by steadily reducing the dose of the cathartic, it may still be possible to eliminate the latter entirely and to restore the bowels to spontaneous activity.

In patients suffering from cumulative constipation, i. e., progressive retention of feces, despite daily bowel movements, an occasional laxative is indicated. Even this catharsis may be dispensed with if such individuals would reduce their diet and increase their daily amount of physical exercise. Similarly, in states of so-called biliousness, a rapidly acting purge brings quick relief; but here also prevention is better then cure.

When previously healthy persons are brought to bed by accident or disease, it is perfectly proper to prescribe appropriate cathartics or enemata until the normal habits of

living are resumed. However, the routine purging of patients when no constipation exists is foolish, and purging before operations as a routine procedure has been shown very clearly by Alvarez* to be not only unnecessary but actually detrimental and even dangerous.

Principles of Administration.—Having determined that the use of a cathartic is justifiable, it remains to decide which one to select in the given case, and how to administer it. A rule that must be constantly borne in mind in the treatment of constipation is that the object to be attained, whether by catharsis or otherwise, is to restore to the bowel the natural habit of producing one formed stool daily. It is *not* the object of treatment to bring on fits of violent diarrhea alternating with periods of constipation, —as frequently happens when patients treat themselves with violent purges at more or less frequent intervals. Therefore, the regular use of drastic cathartics, such as castor oil, calomel, salines, or of the milder drugs in excessive doses is decidedly to be avoided. On the contrary, the mildest medicine in the smallest dose that will produce the desired result, is what is needed. Unfortunately, there is a tendency for most cathartics to lose their efficacy with time, so that progressively larger doses are needed for their continued effectiveness. Hurst, however, points out that no addition to their doses is required if two drugs are given alternately for periods of three or four weeks.

On the other hand, should there appear a tendency to spontaneous bowel movements, the cathartic should be omitted entirely on the day on which such action has taken place. In this way the patient will not take cathartics oftener than once every other day and will have a thorough bowel evacuation at least as often.

The administration of cathartics should be so regulated that the stool comes at a convenient time, such as either before or after breakfast, rather than at night or during

*Alvarez, W. C.: Is the Purgation of Patients Before Operation Justifiable? Surg., Gyn., and Obstet., 26: 651-659, 1918.

the more active part of the day. It is always a good plan, especially where a relatively large dose is required, to administer it in divided portions so as to avoid griping and induce a gentle, cumulative action at the proper moment.

Finally, the cathartic chosen should be free from unpleasant effects on the stomach, the intestinal mucosa, the kidneys, and the other organs.

Individual Cathartics.—The principal drugs used for the treatment of constipation may be considered under the following headings:

1. Alkaloids.
2. Vegetable cathartics.
3. Saline cathartics.
4. Mercurials.
5. Substances which increase the bulk of the feces.
6. Glands of internal secretion.

1. *Alkaloids.*—The most useful of the alkaloids is atropin, which acts by paralyzing the vagus nerve endings in the intestinal musculature. In spastic constipation, it behaves as a specific. In lead colic, especially when combined with a cathartic, such as magnesium sulfate, or castor oil, its effect is to produce free and painless movements. Strychnin tends to increase intestinal tonus and is said to be of value in constipation associated with depression of the central and peripheral nervous system. However, in ordinary practice it may very well be dispensed with. The opium alkaloids, codein, morphin, are indicated for temporary use in constipation associated with acute, painful conditions such as biliary or renal colic, enterospasm, and lead poisoning.

2. *Vegetable cathartics.**—These act by increasing peristalsis as a direct result of irritating the intestinal mucous membrane. Among the most prominent of the vegetable cathartics are the anthracene derivatives: cascara sagrada,

*The descriptions of the pharmacologic action of the vegetable cathartics are based largely on Fantus; Useful Cathartics, Chicago, Amer. Med. Assoc., 1920.

aloes, senna, rhubarb, and the artificial anthracene preparation, phenolphthalein. Of all these, cascara is perhaps the best drug to use for the treatment of chronic constipation. It stimulates both the small and the large intestine; it does not gripe; and it does not lose its efficacy even after long usage. Cascara takes from six to ten hours to produce a bowel movement but it is efficient even in bed patients. The bitter taste of the drug is perhaps its chief disadvantage. Although this feature is overcome in the aromatic fluid extract, the dose of the latter is three or four times as large as that of the original preparation.

Aloes differs from cascara in that its action is limited to the colon and in that it requires a longer period—from ten to twelve hours—to produce an evacuation. In other ways its behavior is very similar to that of the first-named drug even in the respect that it can be given for many years without producing bad results or necessitating an increase in dosage. It is commonly administered in pill form.

Senna, like aloes, acts on the large intestine only. It is considerably more drastic than either of the two drugs just considered. Hence, it may succeed where they fail, but it is decidedly contraindicated in spastic and irritative forms of constipation. It requires but four to eight hours to produce an evacuation.

Rhubarb, on account of its constipating after-effects is not to be recommended in chronic constipation. However, the popular rhubarb and soda mixture is of value in the treatment of constipation associated with a gastric hyperacidity. This point will be referred to again in connection with magnesium oxid.

Phenolphthalein is similar in its action to the above cathartics. It requires from six to twelve hours for effect and is somewhat unreliable in its activity. It has been suggested that its effectiveness varies with the amount of alkali in the intestine available for solution. Its great advantage in comparison with the drugs previously men-

tioned is that it is practically tasteless. Its action is generally very mild and pleasant.

Castor oil, another vegetable product, acts on both the small and large intestine. Bland in itself, it is split up with the production of an irritant ricinoleic acid as soon as it comes in contact with the pancreatic juice. The action of this drug is rapid, a stool resulting in four to six hours. Owing to its disagreeable taste and especially to its tendency to increase costiveness after it has acted, it cannot be used for the treatment of chronic constipation. Its usefulness is therefore limited to occasional administration, as in transient intestinal colics, or to more systematic employment, as in mucous colitis and spastic constipation.

3. *Saline cathartics.*—There is still considerable disagreement as to the mode of action of the saline cathartics. According to a widely accepted belief, these salts are nonabsorbable in the alimentary canal and act simply by attracting water into the colon up to a point that renders their solution isotonic with the blood. Hurst,* on the other hand, as a result of x-ray studies on normal people as well as of observations on patients with fistulæ at the end of the ileum, found that the salts reached the cecum in the normal time of four hours, whereas, a characteristic watery stool had been passed two and one-half hours earlier. Furthermore, analysis of the watery stool showed that the percentage of the salts they contained was not increased, the greater part being excreted the next day when the motions were solid. It therefore seems to follow from these observations that saline purgatives are absorbed from the small intestine and act from the blood on the neuromuscular mechanism of the colon, producing increase of both motor and secretory activity.

So much for the mechanism of saline action. As regards administration, it is universally agreed that salines are best taken on an empty stomach and well diluted, for it has

*Hurst, A. F.: Constipation and Allied Intestinal Disorders, ed. 2, London, Oxford Univ. Press, 1922, p. 349.

been shown that all concentrated salt solutions are retained in the stomach until they become isotonic. Individual tolerance to salines varies considerably owing to their behavior in the stomach. On the whole, cathartic salts are not particularly well borne by patients suffering from gastric disorders; and they are at times ineffectual and, perhaps, even dangerous in bed patients and others whose physical exercise is restricted.

Of the various salines, magnesium sulfate is the most powerful and the least adapted for use in chronic constipation. It is said to be converted in the intestine into magnesium carbonate and sodium sulfate, both of which, though soluble, are practically unabsorbable. This explains why magnesium sulfate loses its relaxing action on intestinal spasm when administered by mouth and shows the advantage of its direct local application in such cases.

Sodium sulfate, and more particularly sodium phosphate and magnesium citrate are considerably milder in their cathartic action and for this reason seem to be well borne by certain individuals, despite their continued use for long periods of time. Sodium phosphate is particularly popular in cases of constipation associated with biliary disease. Carlsbad salts (a mixture of sodium chloride 1 part; sodium bicarbonate 2 parts; and sodium sulfate 4 parts), is also in vogue for gall-bladder trouble, and gives good results, as has been previously pointed out, in overcoming the constipation associated with gastric and duodenal ulcer.

Of particular interest to the gastroenterologist is magnesium oxid (heavy calcined magnesia). Given in the form of milk of magnesia or in combination with sodium bicarbonate (in the proportion of 1 part to 6 of the latter), it is of great value not only in hyperacidity and ulcer cases (as already mentioned in the chapter dealing with these conditions), but whenever constipation is associated with any form of gastric disturbance which is relieved by alkalis, whether hyperchlorhydria be actually present or not.

4. *Mercurials.*—Calomel is the member of this group most commonly employed. In the intestine the drug is decomposed into mercuric oxid and free metallic mercury. It is the latter substance that excites peristalsis, acting chiefly on the small intestine. Catharsis is effected slowly, requiring ten to twelve hours, and inasmuch as the unremoved mercury may cause serious inflammation of the large intestine, it is customary to follow a dose of calomel, within eight to ten hours, by a rapidly acting saline cathartic. Owing to this irritating tendency, calomel is quite unsuited for continued employment in chronic constipation. Its chief usefulness is as an occasional purge in cases of "biliousness," a condition characterized by furred tongue, heavy breath, headache, lassitude, malaise, and muddy discoloration of the conjunctivæ. Its success in producing green, so-called bilious stools, has given calomel a false reputation as a cholagogue. The color in question has been shown to be due partly to undecomposed bile, rushed out of the duodenum, and preserved by the presence of the drug, and partly to certain colored mercury compounds formed in the stool.

5. *Substances Which Increase the Bulk of the Feces.*—It has already been pointed out that the dietetic treatment of the ordinary type of constipation is based largely on adding to the diet foods which increase the bulk of the feces. This end is accomplished not only by means of residue containing fruits, vegetables, and cereals, but by the consumption, in excess, of oils as well, the latter having the added value of softening the fecal column. Both of these objects can be achieved by still another means, viz., by the use of agar. Agar is a dried, mucilaginous material made from sea-weeds. It is practically indigestible and readily absorbs water, each dram taking up 100 c.c., so that a small amount taken by mouth yields a much greater amount for excretion. The indications for the use of agar are similar to those for bran and the former may safely be tried where

the latter is not well borne (see page 137). Agar is therefore of special value in spastic constipation and in mucous colitis. Agar is administered best in shredded form, in doses of one or more teaspoonfuls. It is commonly taken at breakfast and may be eaten with cream and sugar, or mixed with cereals, or added to cooked fruit, vegetables, or sauces.

6. *Glandular Therapy.*—It is an old clinical observation that thyroid extract tends to overcome constipation associated with myxedema. It is very possible that this drug would prove useful in other conditions depending on thyroid hypofunction. There is some evidence that pituitary extract may be of value in certain forms of (atonic) constipation.

CHAPTER XI

TREATMENT OF ACHYLIA GASTRICA (ACHLORHYDRIA)

DEFINITION AND DIFFERENTIAL DIAGNOSIS—GENERAL MANAGEMENT—DIET—DRUG THERAPY—CONTROL OF DIARRHEA—TREATMENT OF INTESTINAL DYSPEPSIA

Definition and Differential Diagnosis.—Strictly speaking, achylia gastrica is a functional disorder characterized by the absence of gastric ferments as well as of hydrochloric acid. Very commonly, however, the term "achylia" is used to cover any *neurosis* in which free acid is lacking (achlorhydria), whether ferments are present or not, and the term will be so used in this chapter. In addition to the absence of free hydrochloric acid, achylia gastrica is clinically characterized by increased sensitiveness of the gastric mucosa, by rapid emptying of the stomach, by various intestinal symptoms, such as diarrhea, etc., and by nervous symptoms of varying degrees of severity.

Not all cases in which hydrochloric acid is absent are achylias, however, and it is a matter of importance, therapeutically, to distinguish between the true and the spurious. Among the more common diseases which are *not* true achylia despite the frequent absence of free hydrochloric acid are severe anemias, particularly pernicious anemia; advanced carcinomas, particularly of the stomach (though these may be located elsewhere in the body); long-standing gall-bladder disease; chronic gastritis, particularly alcoholic; and hepatic cirrhosis. The first point in differentiating between these conditions and achylia gastrica, is the recognition of the fact that the former are organic diseases and the latter is a neurosis. It therefore follows that the first-named group generally runs a steady down-hill course,

whereas achylia, though troublesome, is compatible with a fair state of health for years, if not indefinitely, and with a good state of nutrition. Achylia is often indeed quite asymptomatic, and is not infrequently accidentally discovered during a routine test meal examination. Some cases are quite possibly congenital in origin.

Another simple, though not absolutely infallible way of distinguishing achylia gastrica from some of the conditions resembling it is by the test meal. In the former condition the *total* acidity is low, generally under 20 degrees, mucus is not often increased in amount, and food residues are, of course, never present. Conversely, in the latter group, the total acidity is high, sometimes even above normal, mucus is very commonly increased, and food residues from delayed gastric emptying may also be present.

Finally, in the writer's personal experience, true achylia gastrica is considerably more common than the other diseases associated with achlorhydria. About 10% of all gastrointestinal cases and well over 63% of all achlorhydrias are true achylias. Although, as already mentioned, achylia is not unknown in youth, it seems to occur more frequently as age advances. A recent review of the author's records shows that the incidence of this disorder is 5% of all gastrointestinal cases in the third decade, increasing to about 40% in the seventh. There is, to be sure, room for some legitimate doubt as to whether the increase in frequency is really as great as the above figures seem to indicate. It may very well be that some of the cases encountered in advancing years are not really true functional achylias but are cases of chronic gastritis representing one of the common types of degenerations accompanying old age.

Plan of Treatment.—As far as is now known there are no special measures to be recommended for prophylaxis. The active treatment of achylia gastrica may be considered under three heads:

1. General management.
2. Dietetic treatment.
3. Drug treatment.

General Management.—Inasmuch as achylia gastrica is a neurosis, the general management is that of any functional disorder. For details the reader is referred to the chapter on the treatment of digestive neuroses in general. The value of rest is obvious; and in this connection it should always be borne in mind that a change in environment may be the best way of procuring real rest and recreation. In achylics, as in other neurotics, hydrotherapy is a simple, reliable, and thoroughly safe therapeutic measure. For robust folk the sweat bath, the hot pack, the cold shower; and for the more delicate, the tub bath in tepid water, the (spinal) douche, and the cool pack give the best service.

Where the subject is undernourished, the dietetic management, as outlined below, should be directed to include an adequate fattening cure.

Dietetic Treatment.—The object of dietetic endeavor is to assist gastric digestion as much as possible, and at the same time to safeguard the delicate stomach mucosa. This is best accomplished by means of a smooth, nonirritating diet. For this purpose the *standard bland diet* is quite satisfactory. However, inasmuch as stimulation of gastric juice production is theoretically desirable—practically it is an open question as to whether secretion can be restored once achylia is established—the restrictions applying to the use of condiments may well be suspended.

Another modification that should be made in the standard diet is that meat and other proteins should be used in great moderation. This is because achylics have a certain amount of difficulty in handling this class of foodstuffs. This inability seems to be expressed by the almost universal presence of indicanuria in this condition.

A specimen diet form, fit for mild or moderately severe cases is as follows:

Diet in Achylia Gastrica

(Vanderbilt Clinic Diet Lists)

Breakfast:

Fruit (stewed or preserved, except berries), orange juice, grape fruit juice.
Note: Avoid skins, pits and seeds.
Any well-cooked cereal with sugar, milk or cream.
One egg, soft-boiled or poached.
Coffee, tea, or cocoa, with sugar and milk or cream; milk.
White bread (one day old), crackers, toast, with butter.

Lunch and Dinner:

Soup: Bouillon and other soups without solids such as vegetables.
Meat: Any hashed, stewed, scraped or minced meat, such as lamb, mutton, beef, chicken or turkey.
Note: Eat meat only once a day, and then in moderation. See that it is tender and avoid all sinews or other tough portions.
Fish: Baked, boiled, or broiled; oysters (raw) and caviar.
Vegetables: Rice, spaghetti, noodles, asparagus tips.
Note: The following must be eaten pureed or well mashed: Potatoes, peas, beans, cauliflower, turnips, squash, spinach.
Bread (see breakfast).
Drinks: (see breakfast). Avoid soft drinks and liquors.
Desserts: Jell-O (any flavor), custard, tapioca, rice or cornstarch pudding; cream cheese.

General Directions:

Eat slowly and chew your food well.
Use pepper, mustard, ketchup, and spices, but in moderation.
Make your food as appetizing as possible.
Take nothing ice cold.

The avoidance of mechanically coarse and irritating foodstuffs should be most strictly carried out. Anyone who has passed a stomach tube in an achylic subject can vouch for the ease with which fragments of gastric mucosa are torn off and bleeding is started. The stomach lining is undoubtedly equally vulnerable to coarse food particles. All residue-bearing substances, such as green vegetables, nuts, fibrous meats and skins, and fruits with pits, seeds, skins, and pulps, should therefore be rigidly excluded from the diet.

In preparing the food only small portions should be served, and these portions, in turn, should be subdivided as much as possible before being offered to the patient.

Whenever it can be done, all foodstuffs should be mashed or strained. The cooking, in general, should be particularly thorough and only the most tender portions should be included in the diet.

The manner of eating demands special attention. Thorough mastication and deliberate feeding are of the first importance. It should be constantly impressed on the patient that, gastric digestion being at a minimum, proper chewing and preliminary insalivation assume a significance far beyond normal. In patients afflicted with achylia gastrica and particularly in the aged, the teeth are likely to be diseased or missing. Accordingly, it need hardly be pointed out that proper dental care—prophylaxis, repair, prosthesis, as the case may call for—are absolute requisites in the treatment of this condition. Furthermore, particular importance attaches to the hygiene of the mouth in achylia. Under ordinary circumstances a certain amount of oral sepsis may perhaps be tolerated with relative impunity because the resulting pus and bacteria are quickly neutralized after being swallowed by virtue of the antiseptic action of the acid gastric juice. In achylia gastrica, however, this antiseptic action is not available and the infectious agents are not only spread over a frequently traumatized gastric mucosa but are rapidly passed on to increase in number with their progress through the alimentary canal. It thus becomes evident that much of the intestinal catarrh ordinarily associated with achylia gastrica is very likely infectious in nature. This point will be taken up in more detail in a subsequent section (see page 188).

The temperature of food served to achylics is also of some interest. Extremes of heat and cold are unwelcome, but, as a rule, warm foods and fluids are better borne than the opposite. Ice water, and iced foods and drinks in general, are particularly likely to be followed by digestive upsets, commonly by diarrhea.

Drug Treatment.—The medicinal treatment of achylia gastrica centers about the administration of hydrochloric acid. This drug exerts its beneficial action not so much by actually increasing digestion in the stomach, as by restoring the normal gastrointestinal motility. At least this is the impression one gathers from its action in cases of gastrogenous diarrhea. The actual usefulness of the pepsin, commonly prescribed with the acid, is more difficult to prove. Practically, it may probably be omitted with impunity.

Hydrochloric acid may be given either in the dilute or in the concentrated form as follows:

℞

Acidi hydrochlor. dil 30.0

Sig. M. XV-XXX in a glassful of water to be sipped with each meal.

℞

Acidi hydrochlor. (conc.) 5.0

Elix. lactopeptine q.s. ad 60.0

M. & Sig. One to two teaspoonfuls in a glassful of water to be sipped with each meal.

Instead of being taken in the ordinary way, as a concentrated dose before or after eating, it is recommended that the acid be well diluted and that it be sipped slowly throughout the entire course of the meal. The purpose of this technic is to imitate as closely as possible the manner in which hydrochloric acid is continuously secreted by the gastric mucosa under normal conditions. Where desired, a little sugar may be added to the dilute solution. Administered in this manner, as a "lemonade," the acid may be taken indefinitely by the most fastidious individual.

The exact dose necessary to secure the best results varies considerably. It may be a good plan to call upon the sense of taste as a useful deciding factor, in which case the patient may be permitted to increase or diminish a beginning dose to suit his fancy. A peculiar thing about hydrochloric acid medication is the smallness of the dose that may at

times suffice for perfectly satisfactory results. This is all the more striking when we consider that the normal stomach must secrete the acid in large amounts—estimated at 1500 c.c. of 0.15% HCl—daily. Therapeutically, it is by no means necessary to introduce large quantities of acid. Not infrequently, especially after the acute symptoms have been overcome one dose a day suffices for comfort, and in some cases one dose every few days or even less often than that, may be all that is necessary.

The constant burning in the abdomen, ofttimes a troublesome complaint in achylia gastrica, is frequently entirely relieved by hydrochloric acid. A still more paradoxical finding is that some cases of this disorder, whether they complain of burning or not, are not benefited by acid at all but may even be made worse by this medication. Unfortunately, it is impossible to foretell in which instance this is likely to occur and there seems no choice but to go on in every case with the therapeutic test. However, most of the patients who fail to respond to HCl are found to be completely relieved by alkalis, and are therefore to be treated, in effect, precisely as if they suffered from an excess, instead of from an absence, of hydrochloric acid. No satisfactory explanation of this peculiar phenomenon is at present available. It may even be possible that such cases represent not true achylias but secondary anacidities due to such conditions as chronic gastritis from any of its known causes.

Control of the Diarrhea.—Diarrhea is a common phenomenon in achylia gastrica—so-called gastrogenous diarrhea. Owing to the predominance of the intestinal symptoms the stomach condition is often overlooked. Despite all that has been written on the subject, one still frequently meets with patients who have suffered for years from diarrheas and other gross enteric disorders (see next section) without ever having undergone a test meal examination of the stomach. This form of diarrhea is not necessarily a

constant phenomenon. It comes on at odd times, sometimes after intervals of many months, and seems to be brought about by various extrinsic causes: dietetic indiscretions, heart prostrations, overwork, emotional excesses, and so on. It may alternate with periods of constipation. In other cases, constipation may be the rule throughout.

The mild cases of diarrhea require little more than the prescription of a proper diet and of the necessary hydrochloric acid. The diet has already been described and it remains but to point out that when bowel irritation has become manifest, the use of condiments should be strictly avoided.

In the more severe forms of diarrhea, that is, where an originally simple gastrogenous process has become complicated by a superimposed catarrh of the intestines, the principles governing the treatment of diarrheas in general should be strictly followed (see Chapters XIII and XIV). These principles include: (1) rest in bed; (2) severe restriction of the diet; (3) the use of sedative drugs; (4) the employment of enemas.

Bed rest is of the first importance and should be continued until all evidence of irritation (mucus, blood) disappear from the evacuations, and until the number, if not the form, of the stools is again normal. In most cases of simple, i. e., noninfectious, diarrhea this stage is relatively rapidly reached, say, within forty-eight to seventy-two hours. Bed rest exerts its beneficial action by markedly reducing intestinal peristalsis and this measure alone not infrequently suffices to cut short an attack of diarrhea.

During the acute stage, i. e., for the first day or two of bed treatment, the administration of warm or hot drinks, such as tea, is generally sufficient in the way of diet. Cold fluids are to be avoided, since they tend to stimulate peristalsis, as already mentioned. After the flux is controlled careful feeding may be started. There is, unfortunately, no rule to indicate the order in which foods are to be added

in all cases. A certain amount of individual experimentation is unavoidable. Tea and dry toast is a good old-fashioned beginning for most people; or else milk, warm or hot, or fruit juices. Some patients, on the other hand, prefer more solid foods to start with, such as strained cereals, thick gruels, crackers, toast, rice and plain puddings. More of these classes of foods may then be added until the patient has resumed the full diet for achylia, or in more favorable cases the *standard bland diet*. It is important not to overload the digestive tract, and large meals are to be avoided until all tendency to intestinal irritation is well over.

Among the sedative drugs, the bromids hold first place. Ten to fifteen grains of the triple salts may be given three or four times daily. It is best to administer the dose about one-half hour before feeding is attempted, so that by the time the food reaches the intestine the irritability of the latter will be sufficiently inhibited. Where a stronger sedative action is desired codein may be given in quarter grain doses. The readiness with which this alkaloid can be given hypodermatically makes it particularly useful when mouth medication is for any reason contraindicated. If the rectum is not very much irritated from the frequent defecations codein may also be given in the form of a suppository in somewhat larger doses than those just suggested. Morphin is rarely, if at all, indicated in these cases.

Where there is much tenesmus and abdominal pain, soothing enemas are of value. Injections of starch paste are perhaps the most satisfactory. These may be prepared as follows: To three-quarters of a liter of boiling water, add slowly, with constant stirring, one-quarter of a liter of cold water, in which has been mixed two heaping tablespoonfuls of ordinary household starch. The resulting paste, one liter in bulk, should then be poured into the enema can or bag and brought down to a temperature of

120° F. in the bag. The enema should be administered slowly, without much pressure, the patient being in the recumbent position. It is not necessary for the patient to lie on the left side or assume the knee chest posture. An elevation of one or two feet above the rectum generally suffices and the injection should be interrupted whenever painful peristalsis (cramps) is complained of. In this manner a much larger quantity can be introduced than if a continuous flow were attempted. From one pint to one quart is to be retained, depending upon the irritability of the colon. The procedure may be repeated from two to four times daily.

Treatment of the Associated Intestinal Dyspepsia.—Whether diarrhea be present or not, achylics often suffer from various symptoms undoubtedly due to the absence of the normal hydrochloric output into the gastrointestinal tract. Prominent among these are peristaltic unrest, borborygmi, flatulence, distention and "fermentation."

It has already been pointed out that the intestines of all achylics harbor a multitude of bacteria passed down from the upper food and air passages, and that these bacteria are neither dead nor inhibited as they would be if hydrochloric acid were present. On the contrary, they are quite free to proliferate as they travel onward. Furthermore, in view of the abnormal reaction (changed media) of the intestinal contents in achylia, it is conceivable that the intrinsic bacterial flora normally present—which has been shown to be capable of protecting the body against pathogenic organisms introduced by mouth (Herter)*—may be so altered that this protective function is diminished. For these reasons it is advisable from time to time to clear out as thoroughly as possible the entire intestinal tract of these patients.

For this purpose two methods are available. The oldest and readiest is to employ a "smooth" cathartic, such as

*Herter, C. A.: The Common Bacterial Infections of the Digestive Tract, New York, The Macmillan Co., 1907, p. 7, ff.

castor oil. This undoubtedly gives immediate relief and may be repeated with impunity on several occasions. A rather more satisfactory procedure, however, at least in those who can readily swallow the duodenal tube and who pass it without undue delay through the pylorus, is to institute a series of transduodenal flushes. The technic of the treatment has already been described (see pages 28, 168). About a liter of hypertonic solution should be administered at each session. The temperature of the fluid should be 120° F. in the can. In order to insure a sufficiently deliberate flow the bottom of the can should be no more than eight inches above the mouth of the patient. A liter of fluid should be given about twenty minutes to flow into the intestine.

By means of the transduodenal flush a cleansing of the entire digestive tract is effected in a manner that is at the same time safe, thorough and not unpleasant to the patient, and far superior to that achieved by any of the so-called intestinal antiseptics. The treatment may be given three times the first week, twice the second, and then at weekly intervals until the desired results are encompassed. The general improvement in the patient's condition is usually paralleled by a diminution in the indican output in the urine, which can therefore be employed as a convenient check on the patient's progress.

Constipation is to be treated along the lines already described (see Chapters VIII, IX, X).

CHAPTER XII

THE TREATMENT OF GALL-BLADDER DISEASE

General Considerations: Prophylaxis—Treatment of the Acute Attack—Surgical Treatment—Medical Treatment—Diet—Exercise—Drug Therapy—Intraduodenal Treatment—Spa Treatment—Treatment of Obesity

General Considerations and Prophylaxis.—As far as we understand them today, the chief factors in the production of gall-bladder disease are two in number, viz., bile infection and bile stasis. Bile infection, according to what is perhaps the most plausible theory, comes primarily from the blood in the portal circulation, which, in turn, is derived largely from the intestines. The best known example of bacterial infection of the intestine leading to chronic gall-bladder disease is typhoid fever; other intestinal infections, however, may act in the same fashion, and it is very possible that long standing constipation or diarrhea may so increase intestinal permeability to bacteria as to act as common predisposing causes to gall-bladder trouble. It therefore follows that one important feature in the prophylaxis of biliary disease is the active and thorough treatment of all forms of bowel disorders (chronic constipation, mucous colitis, chronic diarrhea, etc.).

As regards the second important factor in the etiology of gall-bladder disease, namely bile stasis or stagnation, we find that it is intimately associated with anything that tends to diminish general bodily activity. A sedentary life, tight lacing, obesity, pregnancy, chronic heart disease, for example, all tend to interfere with free diaphragmatic respiration and, in turn, with the normal emptying of the gall-bladder. It need hardly be pointed out, moreover, that stagnation of bile also renders infection of bile more easy.

It thus appears that the prophylaxis of gall-bladder disease may be summarized in two main postulates, as follows:

1. The prevention of bowel infection and the cure of bowel malfunction, and,

2. The maintenance of general bodily activity, with special attention to the full and free use of the diaphragmatic and upper abdominal musculature.

Active Treatment.—This may be considered under two heads, namely, (1) treatment of the acute attack, and (2) treatment of the chronic condition.

Treatment of the Acute Attack.—In acute cholecystitis or gall-stone colic, rest in bed is obviously the first rule of therapy. For pain, particularly in the latter condition, injections of morphin and atropin are frequently necessary in order to obtain relief. Two other measures, however, are often available and may prove quite efficient in many cases. One is the administration of a general bath at a temperature as hot as can be borne. This often controls colic admirably by securing complete muscular relaxation. A cold compress should always be applied to the head to prevent faintness. The other measure to be kept in mind is the injection hypodermatically, or better, intramuscularly, of from five to fifteen minims of adrenalin hydrochlorid (1:1000). This drug may break up a painful spasm quite as well as morphin and is totally free from the disagreeable after effects of the latter drug.

When the pain is mild, or while it is subsiding, warm or hot fomentations applied to the gall-bladder region may aid in bringing relief. If there is much nausea and retching, a thorough gastric lavage, especially in "tube-broken" patients, should be carried out. In others an emetic may be administered to rid the stomach of food residues. If the bowels have not moved for some time, or if there is much gaseous distention, an enema, rather than a cathartic, is in order. Surgery is not indicated in the acute attack unless there is evidence of progressive inflammatory dis-

ease, such as empyema of the gall-bladder, cholangitis, or perforation.

Treatment of the Chronic Condition.—(a) *Surgical treatment.* The only form of therapy that offers any reasonably certain chance of getting rid of gall-bladder disease once and for all is, of course, surgery. This is so, despite the fact that in some rare cases intrahepatic calculi* may be overlooked at operation or adhesions or other complications may result from the intervention and cause persistence of symptoms. On the whole, however, it cannot be denied that the outcome of surgical treatment of gall-bladder disease is eminently satisfactory—far better, for example, than is so often the case with gastric operations.

On the other hand, surgery should not be looked upon as the first resort in treatment. The dangers associated with more conservative management, such as the development of suppurative cholangitis or of carcinoma of the gall-bladder are far too likely to be exaggerated by those too enthusiastic in advocating radical measures. The indications for surgery would seem to lie rather in the course of the disease than in the existence of the disease *per se*. If the attacks are repeated at frequent intervals, if there is persistent indigestion between the outbreaks, if there is evidence of increasing infection of the biliary passages, and particularly if the patient himself or herself is desirous of permanently and quickly putting an end to the disorder, surgical intervention should be undertaken. If, however, after a single attack there is no further trouble, if the seizures occur at very long intervals and are not of excessive severity, if the indigestion can be effectively controlled by appropriate dietetic and other conservative measures, or, if, on the other hand, the biliary disorder is complicated by some other organic disability, such as heart disease or diabetes, for example, operation may quite advantageously be deferred or altogether omitted.

*Beer, E.: Intrahepatic Cholelithiasis, Medical News, 85: 202 and 244, 1904.

(b) *Medical treatment.* Very little, if anything, can be done by medical measures to remove gall-stones, once formed. The real aim of medical management is to take care of the catarrh of the gall-bladder and bile ducts, and, particularly to overcome the accompanying (reflex) dyspepsia. In order to achieve the latter object, it is of the utmost importance that a thorough study of the entire digestive tract be made of the "gall-bladder subject," so that the exact form and nature of the "gall-bladder dyspepsia" be determined as precisely as possible. By this means only can be revealed such important associated abnormalities as achylia gastrica, delayed gastric emptying, pericholecystic adhesions, the various forms of constipation, particularly the spastic variety, and colitis. As soon as these or other conditions are discovered, appropriate treatment should be instituted. It is important to realize that in many cases such "indirect" therapy may be all that is necessary to render gall-bladder disease quiescent. That gallstone bearers may be symptom-free for years and decades has been repeatedly shown by the well-known purely "routine" findings of the postmortem table.

Diet.—Although much has been written about special diet in gall-bladder disease, the only rule that it seems safe to lay down is that the diet should correspond with the idiosyncrasies of the patient and the condition of the digestive tract as determined by a thorough study such as has been already advocated. There is no clear-cut scientific basis for the arbitrary routine elimination of any particular type of foodstuff, such as fat or protein or carbohydrate. In practically all dyspepsias, from any cause, the feeding of small bland meals frequently is recognized as rational, and this is particularly so in gall-bladder disease, because food is admittedly the best cholagogue and it is essential to keep the bile secretion going. Beyond this, only individual findings and individual peculiarities can decide the exact composition of the diet. Obviously, one

would not feed excessive fats to an obese subject, nor meats to an achylic, nor carbohydrates to one who has difficulty with carbohydrate metabolism (diabetes),—one or more of which conditions are often associated with the disease under discussion.

Water drinking is a very important matter. It is well-known that forcing the fluid intake is one of the cardinal principles of the frequently successful spa treatment. The beneficial results obtained from water are probably due to the dilution of bile and to the control of intestinal catarrh and constipation. The water should be taken hot, always on arising, as the stomach is then most likely to be empty, and for the same reason before, rather than during or after meals.

Exercise and Dress.—From the standpoint of prophylaxis, it is important to remember that practically all kinds of physical exercise lead to increased movements of the diaphragm and liver and so bring on an increased flow of bile. When active physical training is impossible, owing to advanced age, the presence of active disease or other disability, deep breathing exercises, practiced carefully but consistently, may prove to be of material aid in maintaining free bile drainage.

In view of the increased frequency of gall-bladder disease in women, as compared with men, it has often been pointed out that tight lacing at the waist may be a factor in predisposing to this condition. Similarly, men should be cautioned against wearing tight belts and they should be advised to support the trousers with the more homely, but far more hygienic, suspenders.

Drug Treatment.—As has already been indicated, there is no specific medicinal therapy for gall-bladder disease. Gentle stimulation of bowel peristalsis by means of salines is very commonly practiced, and, if not carried too far, is probably harmless and may be of some value. For this purpose the mild salts, such as sodium phosphate or sulfate

or Carlsbad salts, are commonly prescribed, to be taken with hot water as a draught on arising (see page 176). A popular combination of these salts is the following:

℞

Sodii bicarb.
Sodii sulf.
Sodii phosph. aa. 30.0
Ft. Pulvis.
Sig. A level teaspoonful in water on arising, or three times a day after meals.

Of all the drugs recommended as cholagogues, only sodium salicylate and bile itself, according to Rolleston,* really fulfill this function. It has already been stated that food increases the flow of bile much more than any medication. If bile is prescribed, the salts of the bile acids (glycocholic and taurocholic) should be administered pure, that is, free from the presence of the bile pigments, which may be irritating.

Intraduodenal Treatment.—The instillation of 25% solution of magnesium sulfate into the duodenum through the duodenal tube, has recently been recommended in order to stimulate the flow of bile and promote the "drainage" of infected gall-bladders.† It can hardly be expected that the bile ducts would dilate as a result of this stimulation sufficiently to permit the discharge of impacted gall-stones. It is also still a question whether this method increases the flow of bile more than would other substances including foodstuffs administered similarly, or even by mouth. There can be no doubt, however, that the removal of infected bile through the duodenal tube prevents its reabsorption through the portal system and thus, as Lyon well points out, relieves the load on the liver in its excretion of toxic products. At any rate, reports of favorable results

*Rolleston, H. D.: Diseases of the Liver, Gall-Bladder and Bile-Ducts, New York, The Macmillan Co., 1912, p. 775.

†Lyon, B. B. V.: Diagnosis and Treatment of Disease of the Gall-Bladder and Biliary Ducts, Jour. Amer. Med. Assoc., 73: 980, 1919.

(e. g., Smithies*) are accumulating and nonsurgical biliary drainage may indeed prove to be a procedure of real value in many forms of biliary affections. Transduodenal flushes can be conveniently combined with this method and are of decided help in overcoming many of the disorders associated with gall-bladder disease, such as colitis, especially of the mucous variety, intestinal dyspepsia of various kinds, and certain forms of constipation.

Spa Treatment.—Spa treatment has its great value in substituting for a patient's irregular living habits a standardized regimen devised entirely for the conservation or restoration of health. Liberation from business cares and worries or from distressing and unhappy conditions of home life are further fundamental factors favoring the success of this form of treatment. The waters are usually sipped while walking about. Rolleston† recommends that this be done an hour before breakfast and again in the afternoon, three-quarters of a pint being taken on each occasion and three-quarters of an hour being devoted to the process. No food should be taken for an hour after the water is consumed. In this country Bedford, Pa., Las Vegas, Hot Springs, Sharon, White Sulphur or Saratoga, are recommended, whereas, in Europe, Carlsbad, Vichy, Marienbad and Kissingen are possibly the best known.

Treatment of the Associated Obesity.—Obesity is such a common predisposing condition or actual association of gall-bladder disease, that its treatment may properly be given brief consideration in this connection.

In planning an obesity cure, the standard height-weight tables already mentioned (see Chapter I), should be used as a guide in determining the exact amount of weight reduction that is desirable. The basic principle in weight reduction is to decrease the food intake and, at the same time, increase the output of energy. Decreasing the food intake

*Smithies, F., Karshner, C. F., and Oleson, R. B.: Non-Surgical Drainage of the Biliary Tract, Jour. Amer. Med. Assoc., 77: 2036-2042, 1921.

†Rolleston, H. D.: Diseases of the Liver, Gall Bladder and Bile Ducts, New York, The Macmillan Co., 1912, p. 779.

requires a most exact supervision of the diet. It is, of course, universally recognized that the consumption of fats and carbohydrates should be reduced as much as possible. It is, however, not enough to advise the patient as to the kind of food to eat or avoid. Very precise directions should be given as to the amount of food as well (see accompanying table). In this connection it may be mentioned that obese subjects often claim to eat but very little. On close questioning, however, many will admit that they consume countless slices of bread or rolls with their otherwise small meals, or they indulge freely in sugar or in butter, or nibble at food between regular feedings. Another common fault with the obese is tachyphagia—they eat so rapidly that they unconsciously consume much larger quantities of food in the same time than those who eat more slowly. In reducing the food intake of such persons fletcherization (i. e., very careful methodical mastication) should be strongly insisted upon, inasmuch as it has been shown that the appetite is sated with much less food when chewing is carried to the limit than when food is bolted without adequate preliminary mouth treatment.

In order to increase the output of energy the patient should be put to work with his body. If his general condition allows it, the more strenuous the physical exercise—such as tennis, rowing, track or gymnasium athletics—the better. Otherwise, a series of graduated body exercises is to be preferred. Body bending and all forms of exercise involving the use of the abdominal, diaphragmatic and waist muscles are of value, provided, of course, there is no evidence of an acute abdominal condition.

Walking in the open air, particularly walking up a grade, as in a hilly country, is to be recommended. All exercise is to be carried to the first stage of fatigue, but never beyond that or to exhaustion. Since the production of free perspiration is to be encouraged, the wearing of warm clothing, such as sweaters, while exercising, is desir-

able. To be of any real value all physical training should be carried out in a systematic manner and it is therefore better to do but a few minutes' work regularly, once or twice daily, than to try to do more sporadically.

Various hydrotherapeutic measures are available in the treatment of obesity. Hot tub baths, at a temperature of 102° F. or over, may be taken for ten minutes three times weekly. Care should be exercised to avoid faintness by applying cold compresses to the head while the bath is continued. Reducing treatment is practiced in institutes (Baruch),* as follows: (1) The patient is kept in a hot-air cabinet for ten or more minutes *after* perspiration begins. (2) During this time he is given one ounce of ice water every three minutes to stimulate diaphoresis. (3) He then enters the douche room and receives a circular douche at 100° F. which is gradually reduced to 90° F. (4) Finally, he is dried with friction, waits in the ante-room for five to ten minutes, and is then dismissed.

A saline cathartic may be ordered weekly to aid in the process of weight reduction.

The following form has been found of value in the routine management of obesity cases:

Diet in Obesity

(Vanderbilt Clinic Diet Lists)

Breakfast:

One orange or apple.
Coffee with 4 tablespoons (2 oz.) of milk.
One teaspoon sugar (rounded).
Two eggs or piece of lean meat 5 × 3 × ½ inches.

Lunch:

One cup beef tea or clear soup.
Tea with 2 tablespoons of milk.
One level teaspoon sugar.
Two slices bread 4 × 4 × ½ inches.
One pat butter 1 × 1 × ½ inches.
Spinach, celery, or other green vegetables (one saucerful).
Lean meat 5 × 3 × ½ inches.

*Baruch, S.: An Epitome of Hydrotherapy, Philadelphia, W. B. Saunders Co., 1921, p. 130.

DINNER:

One cup beef tea or clear soup.
Tea with 2 tablespoons (1 oz.) milk.
One level teaspoon sugar.
One slice bread.
Butter ½ pat, ½ × ½ × ¼ inches.
Meat 5 × 3 × ½ inches.
One potato, or 2 tablespoons of any starchy vegetable without grease.

GENERAL DIRECTIONS:

1. Chew your food extremely carefully.
2. Take hot baths, 10 minutes, Monday, Wednesday and Friday evenings, before retiring.
3. Take Epsom salts, 1 tablespoonful, in cold water, before breakfast, Tuesday morning.
4. Walk at least 20 blocks (1 mile) daily.
5. Take setting up exercises 10 minutes, each morning, before breakfast.

The use of thyroid extract as a routine antifat is not to be recommended. If exceptional conditions should seem to warrant its use, careful watch should be maintained for undue acceleration of the pulse and the occurrence of diarrhea and nervous tremors. On the other hand, where there is evidence of actual thyroid insufficiency (myxedema), the use of the drug is, of course, directly indicated.

CHAPTER XIII

TREATMENT OF THE DIARRHEAS

CLASSIFICATION — GENERAL PRINCIPLES — REST — DIET — SCHMIDT TEST DIET—SPECIFIC MEASURES—LOCAL TREATMENT—DRUG TREATMENT

The therapy of the diarrheas is steadily emerging from a purely empiric to a more scientific basis. The most recent advances in this field include a much more skillful and exact employment of diet than in the past, a more precise utilization of many old and some new drugs, and the introduction of transintestinal flushes. In any attempt at presenting this subject, so many varieties of the disease must be considered—for the diarrheas are, of course, the result of manifold causes—that it will make for clearness if a reasonably comprehensive scheme of classification be followed. The following is suggested as a rational grouping of the forms of diarrhea most commonly met with.

A CLASSIFICATION OF THE DIARRHEAS

A. Functional	B. Organic
	I. Toxic
I. Simple or environmental	1. Mercury
II. Gastrogenous	2. Arsenic, etc.
III. Putrefactive	II. Infectious
IV. Fermentative	1. Specific or primary
V. Endocrine	a. Bacillary
1. Thyroid	Cholera
2. Adrenal	Dysentery
	Tuberculosis
VI. Pancreatic	b. Protozoal
	Amebic
VII. Sprue	Flagellate
	2. Nonspecific
VIII. Nervous	a. Secondary to any of the above whether functional, organic, or due to new growth.
	b. "Ulcerative colitis."

Fig. 59.—Simple colitis with diarrhea. Film 24 hours after opaque meal; no stools (Note: there were 5 small stools within the next 24 hours). Observe "packing" in proximal colon; disappearance of haustrations, spasm, and "fuzzy" filling (due to mucus) in distal colon.

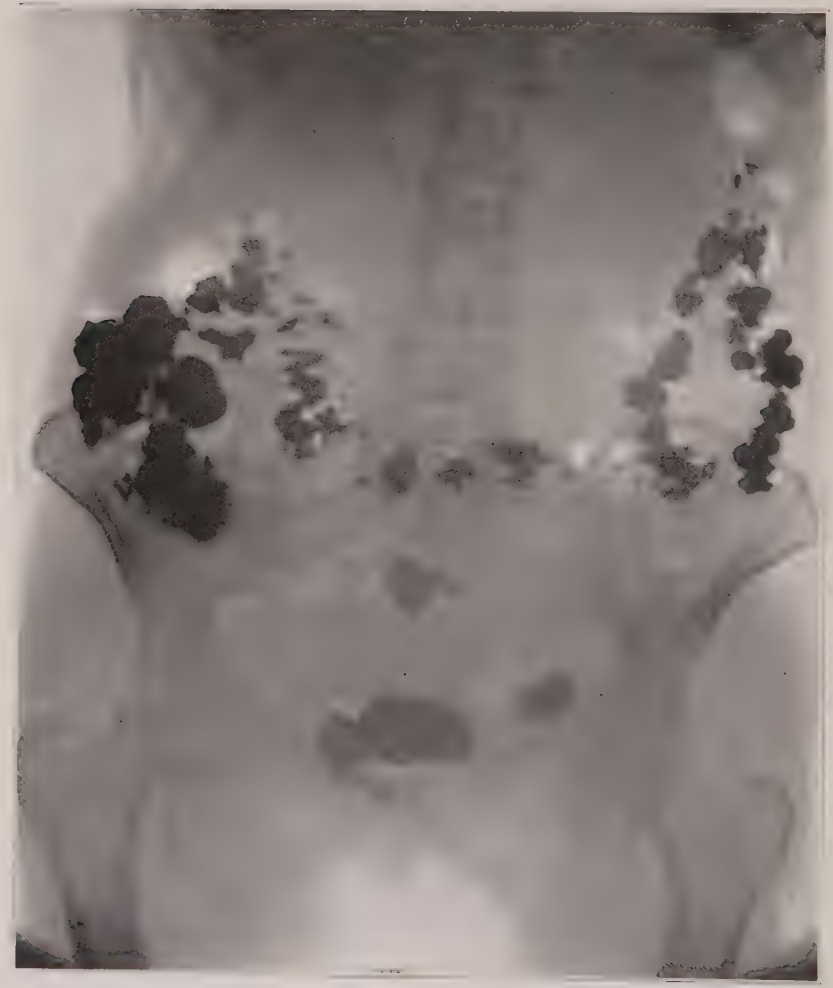

Fig. 60.—Simple colitis with diarrhea. Film 24 hours after opaque meal; 4 small stools. Note abnormal scattering of barium throughout colon, associated with inability to form normal stool segments. Complete absence of haustrations. A case of moderately severe colitis due to long-continued diet of coarse vegetables in a diabetic patient.

It will be seen from the above chart that all diarrheas may be divided into two great groups, functional and organic. This division, here as elsewhere in gastroenterology, is of immense clinical importance, inasmuch as the first practical question to decide before treating any case of diarrhea is whether the process is or is not associated with a demonstrable lesion or infection of the intestinal tract.

The differentiation between these two chief divisions is not difficult. If the stools contain blood, pus and mucus with or without specific infective organisms, and if endoscopic examination of the lower bowel shows actual inflammatory or ulcerative changes, the diagnosis of organic disease is established. Other confirmatory features of organic diarrheas are: Continuous as opposed to an intermittent flux (though this is not universal), persistent pain and tenderness along the course of the colon, positive roentgen findings, and signs of systemic involvement—cachexia, anemia, fever, and severe emaciation.

If, on the other hand, the course of the disease is self-limited, or else intermittent with periods of health between the exacerbations (also not universal), if the stools are persistently free from blood, pus, mucus, and specific organisms, if the endoscopic and roentgen examinations are negative and the general condition fair or but little affected, the case in question is to be regarded as functional in nature.

General Principles of Treatment

The generally recognized principles governing the treatment of all forms of diarrhea may be summarized under the following heads:

1. General body rest.
2. Diet.
3. Specific measures.
4. Local or topical treatment.
5. Drug treatment.

1. **Rest.**—General bodily rest is practically the first measure to apply in the treatment of any case of diarrhea. This is because rest in bed—which is, of course, the most effective way of resting—decreases all smooth muscle activity, and specifically, all peristaltic action. It is a common observation that diarrheas are less active at night and this is not only because food is not ingested but because of the customary repose during this period. In functional cases, particularly, there may be no evacuations whatever during the night hours.

Rest in bed for a period of twenty-four to forty-eight hours may be the only treatment necessary for the control of many mild cases of diarrhea. In this connection it may be stated in a general way that if a flux persists despite a period of bed rest, plus appropriate dietetic management, the case may be regarded as probably organic in nature.

Various physical methods of treatment can be conveniently combined with bed rest. Among these the simplest is the application of heat for the purpose of diminishing peristalsis and controlling colic and abdominal discomfort in general. Wet heat is administered in the form of compresses or poultices. Dry heat may be applied in the form of the hot water bag, or better still, by means of the electric pad or heater.

Other physical measures of possible usefulness are direct sunlight and the quartz (Alpine sun) lamp. These have been recommended particularly in the severe forms of enteritis, such as that due to tuberculous infection.

2. **Diet.**—It is self-evident that the food should be well subdivided, free from irritants, and readily assimilable. Only the best quality of foodstuffs should be selected and the cooking should be as thorough and skilful as it is possible to make it. Vegetables and cereals should be well mashed, strained, or passed through a purée sieve. All residue-containing foods (fruits, coarse vegetables, etc.),

and all irritating and stimulating substances, such as spices, alcohol, etc., should be avoided. Careful and deliberate chewing is of the first importance and the teeth should, of course, receive proper attention.

In most acute diarrheas, and at the beginning of treatment in any of the chronic forms, provided the patient's condition allows it, a starvation period of twenty-four to forty-eight hours may materially aid in hastening recovery. This rest interval may be preceded by a quickly acting smooth purge, such as castor oil, in order to insure the elimination of all irritating or fermenting products that may be present in the intestine. During the fast, thirst may be allayed by allowing the patient to suck small pieces of ice at frequent intervals; or, in more serious cases, by administering fluids under the skin or into the veins. When the acute symptoms are over, as determined by the diminution or disappearance of colic, peristaltic unrest and frequent bowel movements, feedings may gradually be resumed according to the plan selected (see following sections).

Of the greatest usefulness in the study of the chronic diarrheas, particularly of the functional variety, is the intestinal test diet introduced by Adolf Schmidt.* This diet takes the same place in the investigation of intestinal disorders as does the Ewald meal in testing out the functional capacity of the stomach. The Schmidt diet is so well balanced as regards its composition in the principal basic foodstuffs, that the normal intestine digests these substances without the appearance of excessive residues in the fæces. On the other hand, should examination of the stools reveal undigested meat, fat, or starches after a three-day Schmidt regimen, it is safe to assume that the diarrhea in the case in question is due to an inability to handle the class of foodstuffs that appear unchanged in the excrement.

*Schmidt, A.: Die Funktionsprüfung des Darmes mittels der Probekost, etc., 2nd. Ed., Wiesbaden, Bergmann, 1908.

Schmidt Intestinal Test Diet

BREAKFAST:

One pint milk, or tea or cocoa, prepared with much milk.
One buttered roll.
One soft egg.

TEN A.M.

One large plate of thick oatmeal soup, strained, cooked with milk and water, and flavored with sugar or salt.

DINNER:

One large plate of thick potato soup.
One-quarter pound chopped or scraped beef, slightly browned in the pan.

FOUR P.M.

Same as at breakfast without the egg.

SUPPER:

Same as at ten A.M., with one or two buttered rolls, and one or two soft or scrambled eggs.

Not only is the Schmidt diet of value in diagnosis, but in some of the diarrheas, particularly the fermentative, it has real therapeutic value as well. Ofttimes the diarrhea disappears entirely by the time the test is completed, or the flux is so reduced in degree that but few further changes are required in the feeding program to secure a completely successful result.

Other special diets of value will be discussed under the particular forms of diarrhea to which they apply.

3. **Specific Measures.**—Where there is lack of some of the digestive secretions, a specific replacement or substitution therapy is in order. The use of hydrochloric acid in the diarrhea of achylia gastrica comes under this head. In cases of pancreatic insufficiency the administration of the missing ferments is similarly indicated.

Still another form of specific therapy is that directed against certain of the infective organisms which cause diarrhea. Among these are the dysenteric amebae, the dysenteric bacilli, and some of the flagellate protozoa. Treatment of parasitic worms, when these cause diarrhea, may also be considered to come under this head.

4. **Local Treatment.**—The object of local intestinal treatment is threefold, viz., to clean out the bowel of irritating or infectious material, to overcome infection through antisepsis, and to soothe or allay intestinal irritability. For gross cleansing purposes the use of a smooth cathartic, such as castor oil, as already mentioned, is of acknowledged value. Recently the use of transintestinal flushes is coming into vogue. By this means the entire intestinal tract is slowly irrigated from above downward with fairly large quantities (1000 c.c.) of hot hypertonic saline solution (0.9% each of sodium sulfate and sodium chloride).*

Gross† was the first in this country to advocate the use of oxygen insufflations through the duodenal tube in cases of fermentative and putrefactive intestinal dyspepsia.

All sorts of cleansing and medicinal irrigations have been recommended for use per rectum. These will be considered in some detail in the section on the treatment of infectious diarrhea.

For soothing purposes starch and oil injections are of real value. When given at the proper temperature, they tend to control tenesmus and colic. The administration of noncathartic oils by mouth, such as olive oil, also tends to help the healing of lesions in the intestine.

5. **Drug Treatment.**—In most cases of diarrhea, medication is really a matter of secondary importance. Drugs are indicated either in very acute conditions with much tenesmus, pain, and choleraic manifestations, or else in the chronic forms of diarrhea as aids to other forms of therapeutics. Occasionally, however, drugs may act in a specific manner (e. g., adrenalin).

Medicaments used in the treatment of diarrhea may be considered under two great groups, viz., the common antidiarrheics, and the astringents. The antidiarrheics act on

*Jutte, M. E.: Autointoxication and its Treatment by (Trans-) Duodenal Lavage, Amer. Jour. Med. Sc., 153: 732-738, 1917.

†Gross, M. H.: Disinfection of the Intestines by Insufflation of Oxygen, Medical Record, 82: 986-990, 1912.

the nervous system and the neuromuscular control of the intestine. Opium and its alkaloids produce their effects by depressing the reflex irritability of the intestine to stimuli. The usefulness of drugs of this class is limited in practice owing to their tendency to increase inflammatory processes by producing undue stasis. These substances find their chief indications in acute, choleraic fluxes.

Epinephrin (adrenalin) stimulates the sympathetic system, the latter acting as an inhibitory mechanism for both intestinal motility and secretion. The drug seems to be particularly efficacious when given locally in enema form. Some very clear-cut results have been reported from its use (see thyroid diarrheas, below).

Atropin also acts in an inhibitory way on intestinal motility and secretion but it does this by paralyzing the vagus nerve endings instead of by stimulating the sympathetic as does epinephrin. Atropin action, however, is not always uniform. Indeed, paradoxical results—e. g., increase in peristalsis—may occur, according to some authorities, from small doses. On the whole, the successful exhibition of atropin demands considerable clinical experience.

The so-called astringents combine various qualities which make them of considerable value in intestinal therapy. By precipitating albuminoids they increase the consistency of the intestinal content. Furthermore this precipitating action extends to the superficial layers of the intestinal mucosa, and in this way the latter is protected against chemical, bacterial, and mechanical irritants, at the same time that secretion and transudation are markedly diminished. By similarly inhibiting the intestinal bacteria and the bacterial toxins, the astringents come to exert a specific antiputrefactive and antiseptic action. Finally, by their tendency to cause capillary constriction and to dry the surface of the mucosa the astringents diminish the sensitiveness of the intestine to both direct and reflex stimuli.

Except for its use in the form of tea, the classic astring-

ent, tannic acid, has been practically discarded in modern oral therapy. Its place is now taken by the newer preparations such as tannigen (daily dose 2 to 4 grams) and tannalbin (daily dose 6 to 8 grams) which have the advantage of passing unchanged through the stomach.

Even more useful than the above are the bismuth preparations, since the danger of causing too great a depression of motility (stasis) is less with these than with drugs of the tannic acid class. Bismuth, in addition to its mechanical coating effect has the added virtue of binding H_2S in the intestine and removing this irritant by excreting it in the form of the well-known black crystals of bismuth sulfid. Bismuth subcarbonate is perhaps the best known of the bismuth salts. Bismuth subgallate (dermatol), bismuth tribromphenate (xeroform), and bismuth betanaphthalate (orphol) are some of the more commonly employed newer preparations. The daily dose of each of these is one to three grams, best given in the morning, fasting, and at bedtime.

The silver astringents, silver nitrate and the newer protein and colloidal preparations (argyrol, collargol, electrargol, etc.), are used only for intestinal irrigations. Silver nitrate is employed in the strengths of 1:5000 to 1:3000.

Calcium salts also are astringent and tend to decrease peristalsis. Calcium carbonate (dose 1 gram) is the form most commonly administered by mouth. Where distress is caused by evolution of excessive CO_2 in the stomach, the neutral calcium phosphate may be given instead. Greenwald* has recently shown that the gastric reaction is much less changed by the latter salt than by the carbonate, inasmuch as the total acidity is little altered (although the free HCl is diminished). The writer's experience with this drug in diarrheas, associated with gastric hyperacidity has been encouraging. The dose is one to three grams, three or four times daily.

*Greenwald, I.: Personal communication.

Calcium chloride, which is soluble, has been used both for intestinal irrigation in 1% to 2% solution, and intravenously in 5% solution (dose 5 c.c.).

In addition to the anti-diarrheics and astringents, the general sedatives (bromids, chloral, etc.), are deserving of mention. These dependable drugs are of recognized value not only in the nervous diarrheas, as such (see page 218), but in all diarrheas that are associated with a manifest neurotic element.

CHAPTER XIV

TREATMENT OF THE DIARRHEAS
(Continued)

INDIVIDUAL FORMS: SIMPLE DIARRHEA—GASTROGENOUS DIARRHEAS — PUTREFACTIVE DIARRHEA — FERMENTATIVE DIARRHEA — MIXED FORMS—ENDOCRINE DIARRHEAS—PANCREATIC DIARRHEA—SPRUE—NERVOUS DIARRHEA—TOXIC DIARRHEAS—INFECTIOUS DIARRHEAS

Treatment of Individual Forms of Diarrhea

A. THE FUNCTIONAL DIARRHEAS

I. **Simple or Environmental Diarrhea.**—As the name indicates, this form of diarrhea may occur in persons with perfectly normal intestinal tracts. The disorder is brought on by some entirely extraneous factor, such as ingestion of coarse, spoiled, or unripe foods, heat stroke, preventive inoculation, etc. The ordinary summer diarrhea and "acute gastroenteritis" is generally of this character. The treatment is very simple indeed. Bed rest, abstinence from food, in some cases a rapid purge or enema, is all that is needed. Medication with bismuth or chalk mixture is unnecessary, as recovery is just as rapid without drugs. Feeding may be recommended with tea or milk. Many patients will be found to prefer orange juice, or other fresh fruit juices, as they are refreshing and generally well-borne and tend to prevent acidosis. After a day or two, gruels, cereals, toast, and then various soft vegetables, fish and chicken, may be given.

II. **Gastrogenous Diarrheas.**—Three varieties of gastrogenous diarrheas may be distinguished:

1. *Diarrhea with Achylia Gastrica.*—This form is treated by appropriate (bland) diet, by the administration

of hydrochloric acid, and by the control of intestinal dyspepsia. For details of these procedures see Chapter XI.

2. *Diarrhea with Gastric Retention (delayed gastric emptying).* It is an old clinical observation that when food stays too long in the stomach from any cause, it is likely to stagnate or ferment with the result that whatever chyme goes through the pylorus tends to set up an irritation of the intestines that may result in diarrhea. The principles of treatment are those applicable in general to the condition of delayed emptying, viz., feeding in proportion to the ability of the stomach to empty itself, frequent aspirations of old gastric residues followed by lavage, administration of antispasmodics and of alkalies to reduce hyperchlorhydria where this is the cause of pylorospasm, gastroenterostomy in advanced cases, etc. (see Chapter VII).

3. *Diarrhea from Malfunction of Gastroenterostomy.*—The most common condition under which diarrhea occurs following gastroenterostomy is where the stoma is so large that the stomach empties with unusual rapidity into the intestine. The irritation thus produced causes increased peristalsis throughout the remainder of the intestinal tract. The cure for this condition is very careful feeding of small amounts of food, followed by rest in the reclining position after each meal. Preceding the feeding, small doses of bromid may be helpful.

In cases where the stoma is so large or so placed that complete neutralization or even alkalinization (?) of the gastric contents occurs, a condition is produced closely akin to achylia gastrica. In this contingency the administration of hydrochloric acid is indicated in much the same manner as for a true achylia.

III. **Putrefactive Diarrhea.**—This form of diarrhea is commonly intermittent in occurrence. It is associated with an inability on the part of the intestine to digest protein foodstuffs. The stools are fluid, foul, alkaline in reaction, and contain undigested food particles, particularly raw

connective tissue after a Schmidt diet. Often there is a high indicanuria. The fermentation test is negative, i. e., large quantities of gas are not produced and an acid reaction is not obtained after the incubation of a stool (following the test diet) in a Schmidt fermentation apparatus for twenty-four hours. Putrefactive diarrhea is often associated with achylia gastrica.

The treatment of this condition is based on the exclusion from the diet of foodstuffs which (1) introduce putrefactive or putrescible material into the intestines; (2) sharply stimulate intestinal secretion; or (3) increase the peristalsis of the small intestine. With these principles as a basis Schmidt and von Noorden* recommend the following plan of feeding (somewhat modified):

Diet in Putrefactive Diarrhea

1st stage: Starvation for 1 to 3 days. In mild cases 5 ounces of weak tea may be given every 2 to 3 hours. In severe cases nothing by mouth. The fluid requirements of the body should be supplied by the subcutaneous or intravenous injection of 5% glucose solution.

2nd stage: Three to 4 days of sugar water. This is given as a 10% solution of sucrose in boiled water or weak tea. Five to 10 ounces are administered 5 to 7 times daily.

3rd stage: This consists in the gradual replacement of the sugar water with boiled milk or fermented milk products, such as fermillac, zoolak, etc. By the second week the patient should be getting from 1½ to 2 liters of milk food daily and the sugar water may be omitted. During this period cream may be added carefully (up to 8 or 10 ounces daily) in order to increase the caloric value of the diet.

During the second week small amounts of pot cheese may be added, since it has been shown that the lactic acid bacteria already introduced with the milk are sufficient to prevent putrefaction of this particular type of protein. Some of the milk may now be replaced by Nestle's food or malted milk, by barley or oatmeal gruel, and by gruels made of the finer starches, such as arrowroot or cornstarch. Feeding is to be carried out every two hours.

As an alternative to the milk diet outlined above, one may proceed with toasted bread made of the finest wheat flour, allowing 2 to 3 ounces 6 to 7 times daily, and only so much tea as will satisfy thirst. Or else 2 ounces of the best quality of cooked rice may be given at each feed, prepared with a minimum amount of water.

*Schmidt, A. and v. Noorden, C.: Klinik der Darmkrankheiten, 2nd Ed., Munich, Bergmann, 1921, p. 299, ff.

4th stage: All of the above items may now be given in combination, viz., milk and milk preparations, cream, pot cheese, gruels, rice, and toasted white bread. The vegetable proteins (legumes, such as peas) are next to be added, then eggs, and finally chicken, fish and meat.

Alcoholic drinks, such as red wines and spirits, are allowed, where necessary, in all stages. In the mild cases, normal diet may be resumed in 2 to 3 weeks; in the severe cases in 4 to 5 weeks.

IV. **Fermentative Diarrhea.**—In this form of diarrhea the intestine is unable to digest starches, particularly when the starch cells are enclosed in vegetable cell membranes or envelopes. The stools are large, pultaceous, light colored, frothy, sour smelling and acid in reaction. Stool examination after the Schmidt test diet shows numerous starch cells and the presence of characteristic granular spore-bearing bacilli. The fermentation test shows the production of large quantities of gas.

The object of therapy is to free the intestine as much as possible of all acid and fermentation-producing bacteria. To this end all carbohydrates are excluded from the diet. The regimen prescribed is very similar to that used in diabetes with the additional restriction that here even the carbohydrate-poor vegetables, such as the greens, are also eliminated. The details of feeding are as follows (modified from Schmidt-v. Noorden):

Diet in Fermentative Diarrhea

1st stage: This stage lasts from 6 to 10 days. A preliminary fast period of 1 to 2 days is always desirable.

Breakfast: Eight to 10 ounces of protein milk*. Two soft boiled eggs.

Ten A.M. Five to six ounces of fresh pot cheese to which may be added after a few days an ounce of fresh butter. One cup of beef tea.

Dinner: Beef tea or beef tea jelly. Fine well boiled, roasted, or pot roasted meat, or boiled or broiled fish with drawn butter. Red wine. Jell-O (wine or lemon flavor, sweetened with saccharin).

Four P.M.: Ten ounces protein milk. One soft egg.

*Protein milk is prepared as follows: To 1 quart of milk add 1 teaspoonful of Simon's essence of rennet (or a similar amount of any other standard ferment). Place in water bath at 42° C. for ½ hour. After the coagulum of milk is formed, put it in cheesecloth and let it strain slowly by gravity for an hour. Then remove coagulum and place it in a very fine sieve, and while washing with ½ quart water force coagulum slowly through the sieve by means of a wooden spoon. This procedure is repeated several times. To the finely divided coagulum now add ½ quart buttermilk. The whole may be sterilized by boiling.

SUPPER: Two eggs scrambled in butter. Finely chopped chicken. One ounce cheese, or Jell-O, as at noon.

Note: Acetonuria may appear during this stage, but according to v. Noorden, it is harmless and ceases after 2 to 3 days.

2nd stage: Gradual addition to the above, in small quantities, of corn and arrowroot "blanc manges", strained oatmeal and barley gruels, or, if these are unavailable, infant foods such as Nestle's. Small amounts of sugar may be added, as desired.

3rd stage: Replacement of the protein milk with increasing amounts of fermented (i.e., lactose-poor) milk, such as kefir or zoolak or fermillac, and later with whole milk. Gradual addition of fine wheat products, such as zwieback, toasted white wheat bread, and sponge cake made of wheat flour, butter, sugar and eggs. Next are added fine puréed (strained) vegetables, such as spinach, young carrots, young kohl-rabi, etc. Following this, mashed potato and apple sauce may be given. Butter may now be given freely. All the above vegetables contain at most small quantities of cellulose. The following menu may now be ordered:

BREAKFAST: Tea with milk and sugar, or cocoa with milk. Toasted white bread with butter. Two soft or scrambled eggs.

Ten A.M.: Ten ounces fermented milk or whole milk. Toast or bread with butter.

DINNER: Beef tea with or without fine cereal flour (rice flour, farina, cream of wheat). Finely chopped meat or fish, later with mashed potato. Puréed vegetables. Toast with cheese and butter. Dessert of Jell-O; later apple sauce.

Four P.M.: Milk or milk modification. Toast with butter.

SUPPER: Scrambled eggs. Toast with butter and pot cheese. Warm or cold meat or fish.

Ten P.M.: Milk, or milk modification.

4th stage: During this period the bowel is trained, under the most careful supervision, to handle material containing crude fiber (vegetable cell wall membranes). It is best to begin with wheat bread and well-cooked porridges made of such cereals as oatmeal, barley, rice, wheatena, cornmeal, etc. Later boiled or baked potatoes may be given. Other stewed or canned fruit may now be added in addition to apple sauce. Finally, coarser breads, such as graham, or whole wheat, and raw fruit may be tried, if the patient so desires.

Mixed Forms (Putrefactive and Fermentative).—Here a preliminary starvation period of two to three days serves to control both the putrefactive and the fermentative dyspepsia. This should be followed by a two to three day period of sugar water feeding, as in the second stage of putrefactive dyspepsia. After this an abrupt change

should be made to the first stage of the fermentative diarrhea regimen (protein milk, eggs, cheese, butter, beef tea). From this point on no further rules can be laid down as the treatment must be empiric. Most of the cases are not simple dyspepsias (functional) but are really instances of enterocolitis (organic).

V. **Endocrine Diarrheas.**—The diarrheas of both Addison's disease (adrenal insufficiency) and Basedow's disease (hyperthyroidism, thyreotoxicosis) resemble each other clinically. The onset is sudden, the stools are watery and contain mucus and bilirubin (an indication of insufficient reduction of bile pigments to the normal state of hydrobilirubin), and the attacks often end as abruptly as they commence. In both these types of diarrhea very satisfactory results are reported from the use of suprarenal substance by rectal injection.* Twenty-five to thirty drops of the 1:1000 solution of adrenalin chlorid are given in 200 to 300 c.c. of water. It is safe to repeat such an enema several times daily, as it has been shown that adrenalin, when applied intraintestinally, has no systemic action whatever. As a matter of fact, however, a second injection in the twenty-four hours is seldom necessary, inasmuch as ordinarily no stools are passed from fifteen to twenty-four hours following the treatment. The author's personal experience with this method, though limited to date, has been very satisfactory.

Lately Shapiro and Marine† have obtained relief of diarrhea in Basedow's disease from the use by mouth of a glycerine extract of suprarenal cortex. This preparation has the added advantage of exerting a markedly beneficial effect on many of the other symptoms of the disease.

VI. **Pancreatic Diarrhea.**—In deficient external secretion of the pancreas (obstruction to the duct of Wirsung), the stools are characteristically bulky and foul and contain

*Eppinger, H., and von Noorden, K. H.: Zur Therapie der Basedowschen Diarrhöen, Internat. Beitr. z. Path. u. Ther. d. Ernährungsstör., 2: 1-6, 1911.

†Shapiro, S. and Marine, D.: Personal communication.

large amounts of unchanged (neutral) fat and meat fibres (steatorrhea and creatorrhea, respectively). The only treatment for this condition is the administration of pancreas "extract." Sometimes the commercial preparations, e. g., pancreatin, prove effective, but when these fail an attempt should be made to secure fresh pancreas tissue from the abattoir. This may be administered either raw in chopped (sandwich) form, or as a glycerin extract of the whole gland.

VII. **Sprue.**—So long as the exact etiology of this disease is still not definitely agreed upon, it seems best to include the condition among the functional diarrheas. The stools in sprue are very distinctive. They are passed most often in the morning, are not usually accompanied by pain or tenesmus, and seldom exceed two or three in number in the twenty-four hours. The movements are very copious, foamy, and vary from pultaceous to fluid in consistency. The smell is penetrating and the reaction always sour. Their color is characteristic, namely, a light yellow or brown, due to their large fat content and to the presence of leucobilirubin, a reduction product of hydrobilirubin. The excess of fat is due to fatty acids and soaps; the neutral fat output is not increased.

For the treatment of sprue, three different plans of feeding are in vogue, namely, the "strawberry" diet, the "milk" diet, and the "meat" diet. The effect of strawberries is said to be almost specific and improvement is so striking that these berries may be used as a therapeutic test. When used to effect a cure, the berries may be given in gradually increasing amounts daily. Milk may readily be combined with the strawberry diet. Bananas and other fruit are also commonly added.

The milk diet, as practiced by Ashford,* consists of eight ounces of milk every two hours, nine feedings in twenty-

*Ashford, B. K.: Relation of the Genus "Monilia" to Certain Fermentative Conditions of the Intestinal Tract in Porto Rico, Jour. Amer. Med. Assoc., 64: 1893-1896, 1915; The Dietetic Treatment of Sprue, Amer. Jour. Trop. Dis. & Prev. Med., 3: 377-389, 1915-16.

four hours, increasing the feeds by one ounce every four days until thirteen ounces are taken every two hours for one week. The milk should be taken cold through a straw. To the milk is added one-half a culture tube of Bacillus bulgaricus to each feeding. When thirteen ounces are reached, one banana is added to the day's feed, and every fourth day one more is added for every ounce of milk to be subtracted per feeding. When ten ounces of milk every two hours and three bananas a day are reached, the diet is usually modified to include eggs, fruit and vegetables, with a low carbohydrate content.

The meat diet is preferred by some and is certainly to be employed whenever milk is unavailable or is objected to. E. J. Wood* employs a "strict beef diet, to which are added copious drafts of hot water. The beef is deprived of fat and fiber and is then carefully chopped but never ground. It is made into balls which are very lightly cooked on a hot iron. From eight ounces to two pounds, divided into four portions are given in twenty-four hours." The effect on the anemia, as well as on the diarrhea, is said to be striking. Small portions of toasted bread crumbs are added to the beef diet. After a while fruit and vegetables are introduced and the beef may be gradually withdrawn.

Brown† has demonstrated the absence of the pancreatic ferments in certain chronic cases of sprue. He reports great improvement and some apparent clinical cures from the regular employment of pancreatin. The dose is 10 grains, three times a day, after meals.

VIII. **Nervous Diarrhea.**- It is important not to classify as purely nervous those diarrheas which may occur in neurotic individuals, but which are really due to some form of intestinal dyspepsia. For true nervous diarrheas, such, for example, as the fear or anxiety types occurring during

*Wood, E. J.: Article "Sprue," Nelson Loose-leaf Medicine, New York, 1920, Vol. 5, p. 468.

†Brown, T. R.: The Absence of Pancreatic Secretion in Sprue and the Employment of Pancreatic Extract in the Treatment of this Disease, Amer. Jour. Med. Sc., 161: 501-507, 1921.

periods of great emotional upset, there is no specific treatment. Only a general plan of management, such as that applicable to all neuroses, can be instituted in these subjects with the hope of building up the general neuromuscular control and diminishing undue irritability. Mild attacks may be warded off or cut short under favorable conditions by the exhibition of sedatives, such as bromids, chloral or codein.

B. The Organic Diarrheas

I. **Toxic Diarrheas.**—The toxic diarrheas originate from the excretion into the intestine of various drugs when given in poisonous doses. These drugs may be administered by skin (inunction, hypodermic injection), or into the blood stream (intravenous injection), as well as by mouth. The drugs most commonly responsible for the production of an enteritis of this type are those used in the treatment of syphilis, namely, mercury and arsenic (arsphenamin). The former drug is not infrequently used for suicidal purposes.

In regard to treatment it is important to recognize the fact that the diarrhea is protective in nature in such cases, inasmuch as the bowel furnishes the chief, if not the only effective means, of eliminating the poison. Not only, therefore, should such diarrheas not be checked, but further intestinal elimination should be stimulated by catharsis and colonic irrigations, until it is certain that the noxious factors have been removed. After this has been accomplished, the remaining enteritis should be treated as any nonspecific infection (see below).

II. **Infectious Diarrhea.**—The diarrheas of *cholera and bacillary dysentery* are treated by (1) rest in bed; (2) emptying the digestive tract by rapid purges; (3) bland diet; (4) intravenous or subcutaneous introduction of saline solution to overcome the tremendous concentration of the blood, due to loss of tissue fluids; (5) specific serum therapy where this is available. For further details of treat-

Fig. 61.—Tuberculous colitis. Film 9 hours after opaque meal. Note barium in terminal ileum and distal transverse colon with filling defect, indicated by arrows, of cecum, ascending colon, and proximal transverse colon. So-called Stierlin phenomenon, a very characteristic appearance.

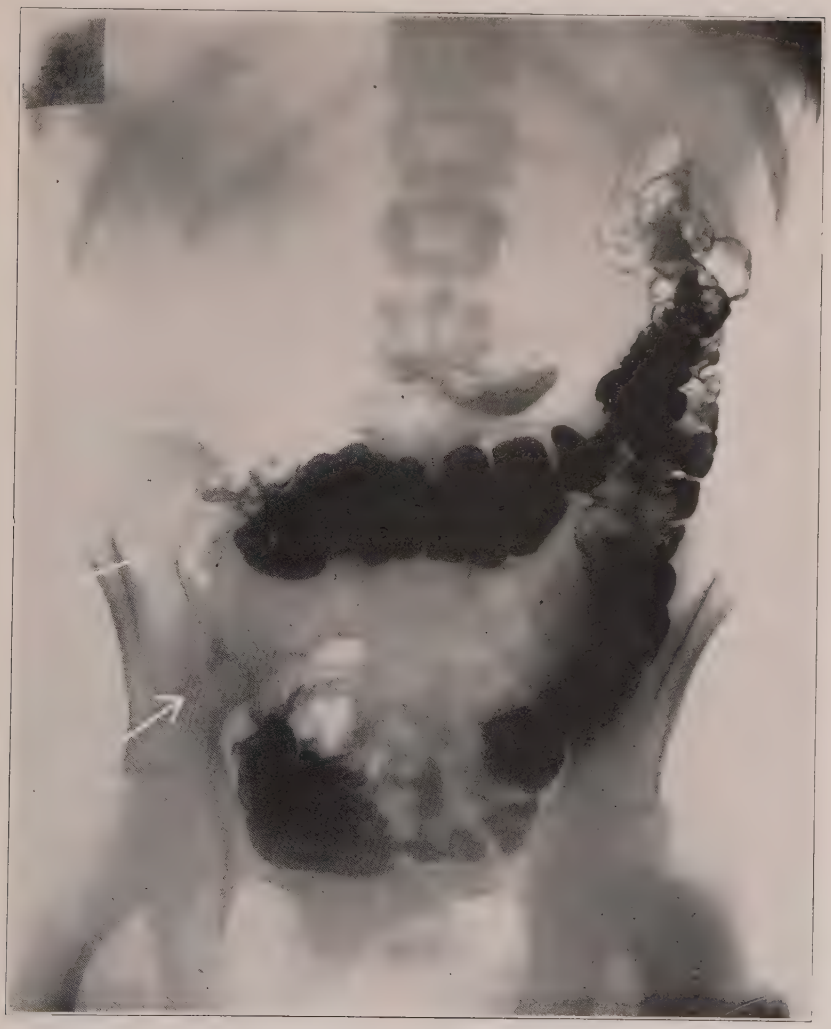

Fig. 62.—Tuberculous colitis. Film 9 hours after opaque meal. Note small gastric residue, barium in terminal ileum, and in transverse, descending, and iliac colon, with filling defect of cecum and ascending colon (arrows). This portion of the bowel, outlined by gas, is seen to be characteristically contracted and deformed.

ment reference should be had to special monographs or to works on general medicine.

In regard to the treatment of *diarrhea due to tuberculous enterocolitis*, it is the writer's opinion that much could be done to prevent or mitigate this evil, if proper attention were regularly given to the diet, particularly in the early stages of the disease. There is reason to believe that a serious study of each case of diarrhea in a tuberculous subject made from the standpoint of establishing the exact form of intestinal dyspepsia—whether putrefactive or fermentative—might yield valuable indications for proper dietetic management.

Otherwise the treatment of this form of diarrhea is purely symptomatic. Hot compresses to the abdomen help to promote comfort. Good results have been obtained (Rollier) from the use of direct sunlight (heliotherapy) on the abdomen. The use of the quartz (Alpine sun) lamp is also said to be of palliative value. Relief of the diarrhea has been obtained from the intravenous injection of 5 c.c. doses of 5% calcium chlorid solution. Fishberg† who has recently tried out this method, finds it effective only in cases of early tuberculosis.

The *protozoal diarrheas* are characterized by their tendency to recrudescence after long intervals, sometimes years in duration. This is particularly true if insufficient treatment is given in the early stages of the infection. Before attempting specific therapy in these cases, the bowel should be well emptied. Smithies‡ puts the patient on liquid diet for two days before beginning active treatment and orders a glass of citrate of magnesia each morning. In the entameba cases he orders the patient to bed, continues the liquid diet, and applies hot pads moistened in boracic alcohol mixture over the abdomen. A ten-grain

*Rollier, A.: Heliotherapy, London, H. Frowde, 1923.

†Fishberg, M.: Calcium Chlorid as a Palliative Agent in the Treatment of Intestinal Tuberculosis, Jour. Amer. Med. Assoc., 72: 1882-1884, 1919.

‡Smithies, F.: The Frequency of Protozoic Enterocolitis in the Middle-West: Clinical Manifestations, Diagnosis and Treatment, Amer. Jour. Med. Sc., 156: 173-184, 1918.

"alcresta" (aluminum salicylate of ipecac) tablet is given every hour by mouth and a third of a grain of emetin hydrochlorid is administered hypodermatically every four hours for two days. If the stools show diminution of the parasites, the dose of ipecac and of emetin is then reduced by one-third and this is continued for another two-day period. Usually by the end of the first week the patient is taking one to two grains of emetin hypodermatically daily, as well as ten grains of "alcresta" ipecac four times daily. The colon is lavaged night and morning with four quarts of hot normal saline, or with a solution of quinin, 1:3000 and thymol, 1:5000 in normal saline.

On the sixth day the patient is put on a fat-free diet for twenty-four hours in order to render the administration of thymol safe. On the seventh day thymol is given in the evening, followed the next morning by epsom salts. The same combination is repeated, starting on the evening of the tenth day. If parasites are still present after two weeks, Smithies orders a colonic lavage with saline, followed by one-half to one liter of commercial kerosene given slowly per rectum and retained for one hour, if possible.

The diarrheas caused by the flagellate protozoa, particularly by Lamblia (also called Giardia), may prove extremely difficult to cure, as these parasites have been shown to lurk for years in the gall-bladder or appendix. Smithies recommends the same general plan of treatment as for amebiasis, but instead of emetin and ipecac, he orders evening doses of five to fifteen grains of calomel, followed by two ounces of epsom salts the next day. The calomel medication is repeated every five days until the stools are negative.

The use of neoarsphenamin in large doses has recently been urged for the treatment of protozoal infections (Carr and Chandler).* Chandler† claims that "the successful

*Carr, E. I., and Chandler, W. L.: The Successful Treatment of Giardiasis in Man with Neoarsphenamin, Jour. Amer. Med. Assoc., 74: 1444-1445, 1920.

†Chandler, W. L.: Personal Communication.

employment of neoarsphenamin in the treatment of intestinal protozoal diseases depends entirely upon getting enough of this product, or whatever modification of it reaches the intestine, into that organ at one time to kill whatever organisms may be present. The ability to do this depends on the following factors: the size of the dose administered; the ability of the intestinal wall to secrete the product; and the particular species of organism present. For Giardia, for instance, we have found that in patients twenty-five to thirty years of age, who do not have an intensive intestinal ulceration, three injections of 0.6 grams at five-day intervals is sufficient to take care of this infection. If the secretory function of the intestine is impaired through age or extensive ulceration, a larger dose, at least a larger initial dose (usually 0.9 grams) is required to accomplish the desired result. This system of dosage applies as well to the amebas and to Chilomastix. However, Trichomonas and intestinal spirochetes in every case require maximum dosages, at least for the first injection.''

The treatment of *nonspecific infectious (including ulcerative) diarrheas* may be considered under the following heads:

1. Diet.
2. Local treatment.
3. Surgical treatment.

1. *Diet.*—The food should be free from coarse particles and irritating factors (spices, acids, etc.) in order to spare the diseased bowel as much injury as possible. Fluids by mouth should be restricted, inasmuch as the water-resorptive function of the colon is impaired in these cases. Where insufficient fluids for body needs would result from this deprivation, the administration of water parenterically is indicated (saline by hypodermoclysis or intravenously). An associated functional dyspepsia should be sought out by a Schmidt test diet and the feeding modified according to the forms already suggested for the treatment of intes-

Fig. 63.—Ulcerative colitis. Film after opaque enema. Note absence of haustrations, and contracture and stricture of pelvic colon. Arrows point to area most involved.

tinal fermentation or putrefaction. Olive oil is of real value in these cases not only because it soothes intestinal lesions, but because, when it is well borne, it aids materially in improving the state of nutrition.

2. *Local Treatment.*—As previously stated, the object of local treatment is to promote intestinal cleanliness by the removal or sterilization of infectious products, and to soothe the areas of ulceration. For cleansing purposes intestinal irrigations are commonly employed. In general, all irrigations are to be given with a double flow tube, and as much fluid is to be used as the patient can stand or until the return is clear and free from traces of feces, blood, pus and mucus. Plain tap water may be used, or normal saline, or various drugs in solution, such as calcium chlorid, sodium bicarbonate, tannic acid, thymol, silver nitrate, argyrol, potassium permanganate, hydrogen peroxid, etc. Irrigations of ordinary hot water (120° as it enters the rectum) are recommended by Logan* as being curative in cases of ulcerative colitis when the process is limited to the lower bowel. The irrigations are given twice daily for twenty to thirty minutes. Lime water is very useful for the disintegration and removal of mucus accumulations.

As a soothing measure retention enemas of starch paste or olive oil are of value. Logan recommends three ounces of olive oil and sixty grains of bismuth (subcarbonate) to be given nightly in the knee chest position and to be retained as long as possible. He also prescribes the same combination by mouth.

Where the ulcerative process is limited to the rectum, rectosigmoid, or lowermost pelvic colon, there is danger that the ordinary colon irrigations may make matters worse by carrying infection from below upward into healthy segments of the large intestine. In such cases one of the following methods of administering local treatment is applicable.

*Logan, A. H.: Chronic Ulcerative Colitis, Northwest Med., 18: 1-9, 1919.

Fig. 64.—Apparatus for calomel insufflation in proctitis, showing short anoscope at top and DeVilbiss powder blower at bottom.

Transintestinal flushes by means of the duodenal or intestinal tube are now being used with some success in cases of intestinal ulceration (Einhorn).* This method would seem to be particularly appropriate to those patients who are "tube-broken," i. e., those who can swallow and pass the tube readily beyond the pylorus. By this means flushes can be given in the physiologic direction, from above downward. A quart of hot (110°) hypertonic saline (Jutte's solution) may be administered slowly, over a period of twenty to thirty minutes. If desired, various medicaments —including the new antiseptic dyes, such as methylene blue or gentian violet—may be added to the flush solution. The treatment is usually followed within an hour by several watery evacuations. The tube may be retained for days without trouble, or it may be reintroduced at intervals. Flushes may be given daily, or two or three times a week, as occasion warrants.

In cases of infection and ulceration limited to the lowermost bowel, insufflations of calomel powder may be made once or twice a day. Soper† has pointed out the antiseptic and healing value of this method. A short proctoscopic tube is introduced and, as it is withdrawn, a mixture of equal parts of calomel and bismuth subcarbonate is blown in through a DeVilbiss insufflator. The bismuth is added to the calomel to prevent corrosion of the proctoscopic tube. As the insufflation is made the open end of the tube should be kept covered with a pledget of cotton.

Topical applications are, as a rule, unnecessary when insufflation treatment is given. However, simple chronic ulcers yield to direct cauterization with carbolic acid (Soper).

3. *Surgical Treatment.*—Where the above measures fail to control colon infection and ulceration, the advisability

*Einhorn, M.: A New Intestinal Tube with Remarks on its Use in a Case of Ulcerative Colitis, Amer. Jour. Med. Sci., 161: 546-550, 1921.

†Soper, H. W.: Article, "Inflammatory Processes, etc., of the Rectum and Sigmoid," Nelson Loose-Leaf Medicine, N. Y., 1920, vol. 5, p. 415.

of surgical treatment should be considered. Conservative procedures should, of course, be employed first. These are all directed toward securing better cleansing of the large intestine. Both appendicostomy and cecostomy allow of the introduction of a tube for the permanent flushing of the colon (Gant*). Lynch† prefers an ileostomy for the same purpose. In extensive ulcerative colitis, where practically the entire large intestine has degenerated into a necrotic pus tube, partial or complete colectomy may be attempted (Yeomans).†† Needless to say, such procedures are attended by a high rate of mortality. Yet in extreme cases there may be no alternative.

For the progressive anemia associated with the continuous loss of blood, repeated blood transfusions are indicated and this procedure has been reported as curative in some cases.

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*Gant, S. G.: Surgical Treatment of Chronic Enterocolonic Diarrhea, Jour. Amer. Med. Assoc., 69: 1603-1606, 1917.

†Lynch, J. M. McFarland, W. L., and Draper, J. W.: Colonic Infections, Jour. Amer. Med. Assoc., 67: 943-948, 1916.

†† Yeomans, F. C.: Chronic Ulcerative Colitis, Jour. Amer. Med. Assoc., 77: 2043-2047, 1921.

CHAPTER XV

TREATMENT OF HEADACHES ASSOCIATED WITH INDIGESTION

CLASSIFICATION — NEURASTHENIC HEADACHES — HEADACHES AND "AUTOINTOXICATION"—GASTRIC TYPES—INTESTINAL TYPE (CONSTIPATION)—MIGRAINE—DESENSITIZATION TREATMENT—PITUITARY HEADACHES

Classification.—Under this title shall be discussed not only those headaches which are primarily digestive in origin but also those which are associated in any way with symptoms distinctly referable to the digestive system. All such headaches, be it observed, are essentially functional in nature and are therefore to be distinguished from headaches due to organic causes, such as local diseases in the head (tumor, meningitis, sinusitis, otitis, eye-strain, etc.), or systemic diseases elsewhere in the body and non-gastrointestinal in nature (cardiovascular and renal degenerations, syphilis, blood dyscrasias, certain chronic infections or intoxications, etc.).

For the purpose of discussing therapy, headaches associated with indigestion may be arbitrarily divided as follows:

1. Neurasthenic headaches.
2. Headaches associated with so-called autointoxication.
3. Migraine or sick headaches.
4. Pituitary headaches.

Neurasthenic Headaches.—These constitute a large but rather indefinite group. As the name implies they occur in neurasthenics, that is in hypersensitive and nervously unstable individuals. The headaches may be mild or severe in intensity, and rare or frequent, regular or irregular, in

occurrence. Except for a constant tendency—a feature common to all functional upsets—to be precipitated or aggravated by strains and excesses, whether mental, physical or emotional in nature, their immediate etiology is obscure. In this respect they differ markedly from the special forms of headache to be considered later for which either the patient himself, or the physician, can assign some tangible reason.

It will not be found surprising, therefore, that for the treatment of neurasthenic headaches only general, rather than specific, recommendations are available. The physician must be prepared to employ any or all of the measures already outlined for the management of the functional disorders of digestion (Chapter II). Such measures attack the evil by toning up the entire autonomic or neuromuscular system, and comprise, categorically, the cultivation of regular hygienic habits, out-of-door living, the practice of physical exercises, and the employment of systematic tonic hydrotherapy. If the patient is fatigued, rest is indicated, whether this takes the form of a bed rest cure or of a complete change of occupation and environment; if the subject is undernourished a fattening diet is in order; and in marked cases of visceroptosis a firm abdominal support should be provided.

In most cases, the strict execution of the above procedures will bring about, if not a complete cure, at least a distinct amelioration in symptoms. If for one reason or another these measures fail, suggestion may be tried with advantage. Neurasthenics, being very sensitive, are often very impressionable as well. This is illustrated, for example, by the cures produced by Christian Science in this class of patients. The physician may therefore accomplish much by a persistent and dominating policy of wholesome encouragement. This attitude may, if occasion arises, be legitimately reinforced by the temporary administration of a placebo.

In those cases, however, where active medication seems unavoidable, bromids, or some of the newer sedatives such as luminal, bromural, or dial, may be prescribed for relatively long periods with perfect safety. The administration of the more powerful analgesics, or of out-and-out narcotics should be conscientiously avoided. Fortunately, the suffering from headaches of this character is probably not so severe as that associated with the violent periodic explosions of migraine, for example, and the risk of establishing a crippling narcotic drug habit is correspondingly smaller.

Headaches Due to "Autointoxication."—Under this head may be considered those headaches commonly assumed to arise from abnormal gastric or intestinal digestion. Three sub-groups may be distinguished.

a. *Headaches associated with gastric hyperacidity.* These respond definitely to the administration of alkalies. Ordinary baking soda or the alkaline powder previously mentioned (see page 78) can be relied upon to give relief. In addition to the gastric superacidity there may be an increased urinary acidity as well, pointing to the coexistence of a more extensive systemic disturbance. On the other hand alkalies may relieve headaches in the presence of normal or low gastric acid values.

b. *Headaches associated with gastric anacidity or subacidity.* This group is the direct opposite of that just considered. In some way the lack of hydrochloric acid seems responsible for the symptoms. In these cases the prescription of the missing or diminished acid is sometimes followed by brilliant results. For details of administration reference should be had to the chapter on achylia gastrica (see page 184).

c. *Headaches associated with constipation.* It is a very common matter for constipated subjects to suffer from headaches. If the bowels do not move for a day or more such individuals begin to experience a characteristic dull heaviness or sense of pressure, either diffuse, or localized,

as in the orbital or frontal region. The headache is often associated with spots before the eyes, a general feeling of lassitude, and particularly an inability to concentrate mentally. The symptoms generally disappear at once after a bowel action, whether occurring spontaneously or following a cathartic or enema.*

Such headaches should never be given continuous palliative treatment nor should the cultivation of a cathartic habit be in any way encouraged, except in those rare instances where the constipation does not yield to hygienic measures. The cure of these headaches is obviously dependent upon the control of the underlying bowel disorder, for the treatment of which the reader is referred to the chapters on constipation. It may not be out of place to repeat here that even persons whose bowels move daily may in reality be suffering from cumulative fecal retention—a condition which can only be recognized with objective precision by a careful x-ray study of the bowel function.

In the treatment of "autointoxication" in general, a course of transduodenal flushes† is to be recommended. Two or three treatments may be given the first week, one or two the second and then one weekly for a longer period if desired. Colon irrigations are less effective and more irritant, though of course, they are more generally available.

Migraine Headaches.—These are characterized by their familial incidence, by their periodic occurrence, by the absence of symptoms between attacks, and by the frequency of gastrointestinal disorders.

Following a short preliminary period of extreme well-being (in many cases), the attack proper is often commonly

*This fact (the rapid disappearance of symptoms after stool) has been utilized to throw doubt on the theory that the systemic symptoms of constipation are due to absorbed toxins. See especially, Alvarez, W. C.: Origin of the So-Called Autointoxication Symptoms, Jour. Amer. Med. Assoc., 72: 8-13, 1919.

†Jutte, M. E.: Autointoxication and Its Treatment by (Trans-) Duodenal Lavage, Amer. Jour. Med. Sc., 153: 732-738, 1917.

initiated by a distinct aura, readily recognized by the patient. This takes the form of some disorder of the special senses. Very frequent are disturbances of vision, such as a blind spot, or a play of lights or colors. One of my patients knew that whenever the breakfast coffee had a peculiar taste she could look for trouble. These prodromes generally begin on arising. Soon the headache commences and gradually increases to a maximum. The pain is characteristically hemicranial in distribution. Within a few hours the prostration may be so complete that the patient is unable to raise his head from the pillow. Photophobia is marked, as is general nervous irritability.

The gastrointestinal symptoms are likewise progressive. First there is anorexia, then nausea,—"great waves of nausea from my stomach to my head," is one graphic description—finally vomiting. The stomach contents are quickly got rid of, the occurrence of old food in the vomitus indicating the existence of a transient gastric retention (see pages 122, 123). Finally bile is brought up, sometimes in large quantities. During the attack constipation is usually present.

In some cases the vomiting of bile brings prompt relief. In others a night's sleep is necessary before the headache is over. In still others again, the attack may persist for days with milder renewals, and so gradually diminish. When, at last, the siege is over, the appetite may return with unusual vigor,—an effort, as it were, on the part of Nature to make up for the loss of weight which at times may reach excessive proportions. The patient then remains perfectly well until the cycle is repeated.

The frequency of the attacks varies from one or two a week to one in several months. Characteristic is the occurrence in women at the menstrual epoch.

Until recently very little was known as to the etiology of these upsets. There is now increasing evidence that attacks of migraine may represent, in some instances at least,

the response of the organism to some substance or substances to which it has become sensitized. This brings migraine in line with such conditions as asthma, acute eczema, angioneurotic edema and urticaria. In the condition under discussion the noxious substances said to be responsible for the production of the presumed anaphylactic reaction are the various proteins found in the common foodstuffs.

The evidence at present available in support of this view may be presented as follows: (1) Many patients have observed that the ingestion of eggs or meat or other protein materials is followed, usually within twenty-four hours, by a typical attack of migraine headache. When such protein foods are entirely or partially withdrawn from the diet no headache is experienced. (2) Laboratory studies indicate that the liver is characteristically involved in the production of experimental anaphylactic shock. That this organ is similarly affected in migraine seems to follow from the work of Widal* and his associates who explain protein anaphylaxis by assuming the passage of incompletely digested proteins through an insufficient liver into the general circulation. T. R. Brown† has observed a transient enlargement of the liver under similar conditions. (3) It has been shown clinically by Pagniez†† and his co-workers that the ingestion of a small amount of the noxious protein before meals tends to prevent an attack of migraine. This procedure, which has been termed antianaphylaxis or desensitization, has been more recently simplified by the substitution of pepton for the preliminary ingestion in place of the particular protein at fault in each individual case. In this way the specific desensitization is replaced by a group-desensitization for all proteins.

*Widal, F., Abrami, P. and Iancovesco, N.: L'épreuve de L'hémoclasie digestive dans l'étude de l' insuffisance hépatique, Presse Medicale, 28: 893-899, 1920.

†Brown, T. R.: Rôle of Diet in Etiology and Treatment of Migraine and Other Types of Headache. Jour. Amer. Med. Assoc., 77: 1396-1400, 1921.

††Pagniez, P., Valléry-Radot, P., and Nast, A.: Essai d'une thérapeutique préventive de certaines migraines, Presse Medicale, 27: 172-174, 1919.

Various other forms of antianaphylaxis have been attempted with success in some cases, including the use of Liebig's extract by mouth as well as the subcutaneous or intravenous injection of pepton, crotalin, horse serum, and even sodium carbonate. It should be borne in mind that the explanations offered for the phenomena here recorded are still largely purely hypothetical in nature.

The author's experience with this form of treatment has been limited to the use of Witte's pepton by mouth. The drug is given in 0.5 gram dose, in capsule or powder, exactly one hour before meals. The results on the whole have been encouraging, inasmuch as cases were improved or cured which had previously proved refractory to careful treatment over long periods. In some patients the treatment must be continued indefinitely, others fail to respond entirely, while still others become refractory after a variable interval. The best results are secured in subjects who have themselves discovered the harmfulness of protein foodstuffs and have learned to avoid them. Such persons may be brought to tolerate once more a normal diet.

It should not be assumed that all cases of migraine are necessarily associated with protein sensitization. There are for example numerous cases in which the ingestion of excessive or relatively excessive amounts of carbohydrate foods causes headaches similar to if not the same as those of typical migraine.* The treatment here consists of strict carbohydrate-free (diabetic) diet, with possibly the administration of a carbohydrate digestant and appropriate glandular therapy (see under pituitary headaches).

Even where some specific treatment seems applicable, bromids may always be advantageously prescribed in addition; nor should the other general measures, previously mentioned, be neglected. When a classic attack of migraine is in full blast the suffering is sometimes so intense that the use of analgesics is unavoidable. Most of the

*Brown, T. R.: Rôle of Diet in Etiology and Treatment of Migraine and Other Types of Headache, Jour. Amer. Med. Assn., 1921, lxxvii, 1396-1400.

headache powders in common use contain such drugs as acetanilid, phenacetin, salol, aspirin, antipyrin, pyramidon, etc. Fantus* favors the following effervescent powder:

℞

Sodium salicylate	6 0
Potassium bromid	12.0
Sodium bicarbonate	12.0

Mix and divide into 6 blue powder papers.

Tartaric acid	10.8

Divide into 6 white powder papers.

Sig: Mix contents of a white and a blue paper in half a glass of water. Repeat dose hourly if required.

Another simple prescription of this nature is:

℞

Pyramidon	1.0
Caffeine	2.0
Phenacetin	3.0

Mix and divide into 16 powders.

Sig: Take one powder and repeat if necessary.

Should these milder measures fail, more potent drugs such as codein, cannabis indica, etc., may be resorted to, but they are to be employed, it need hardly be repeated, with extreme caution. Where vomiting is continuous the drugs may be given by rectum in suppository form.

Pituitary Headaches.—It has recently been suggested that certain types of headaches associated with difficulty in digesting carbohydrate foods may be due to a functional disorder of the pituitary gland. These headaches are described as being characteristically bi-temporal or supra-orbital in location, as occurring in women during menstruation and as being particularly associated with dysmenorrhea. Unfortunately the writer has had no personal experience with this form of disorders, but others† have re-

*Fantus, B.: Migraine Therapy, Jour. Amer. Med. Assoc., 75: 376, 1920.

†Blumgarten, A. S.: The Endocrine Factors in Some Common Functional Diseases. (a) The Diagnosis and Treatment of Pituitary Headaches, Med. Clin. N. A., Philadelphia, W. B. Saunders Co., 5: 1029-1052, 1922.

Redwood F. H.: Pituitary Headache. Virginia Med. Monthly, 48: 25-26. 1921.

Hodges, J. A.: Migrainous and Pituitary Headaches Contrasted. Virginia Med. Monthly, 48: 203-204, 1921.

ported good results from the administration of pituitary extract, 2 to 5 grains, three times a day. As with other forms of carbohydrate indigestion, it may be well to begin with a strict diabetic regimen and then gradually to add starchy foods in accordance with the patient's tolerance. In addition, the administration of a diastatic ferment—taka-diastase, 2½ to 5 grains, three times daily—may prove of value.

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